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UNITED STATES DEPARTMENT OF AGRICULTURE  
AGRICULTURAL RESEARCH ADMINISTRATION  
Bureau of Plant Industry, Soils, and Agricultural Engineering  
and  
PRODUCTION AND MARKETING ADMINISTRATION

(NOT FOR PUBLICATION)

MILLING, BAKING, AND CHEMICAL EXPERIMENTS WITH HARD RED SPRING WHEAT  
1950 CROP 1/

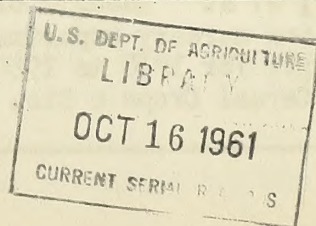
BY

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- 1/ Cooperative investigations of the Division of Cereal Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration and the Grain Branch, Production and Marketing Administration. The samples were obtained from the cooperative experiments with the State Agricultural Experiment Stations in the spring wheat region.

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## INTRODUCTION

Samples of the standard varieties and some of the new hybrid strains of hard red spring wheat, grown in cooperative experiments in the spring-wheat region <sup>2/</sup> of the United States, are milled each year by the United States Department of Agriculture and the flours baked into bread to determine their quality characteristics.

The baking methods and techniques used on the 1950 crop were essentially the same as used in testing the wheat varieties and hybrid strains for the 1944 to 1949 crops, inclusive.

The purpose of this report is to make available to cooperators the quality data from the 1950 crop obtained from standard varieties, new hybrid strains, and commercial hard red spring wheat.

## SOURCE OF SAMPLES

Tests were made on Eastern and Western composite samples of each of five uniform varieties and of many additional varieties and strains grown in plot experiments at cooperating stations. These included samples grown at Madison, Wis.; Morris and Crockston, Minn.; Fargo, Langdon, Edgeley, Williston, Minot, Mandan, and Dickinson, N. Dak.; Brookings, Eureka, and Highmore, S. Dak.; Havre and Moccasin, Mont.; Sheridan, Wyo.; and Akron, Colo. Similar tests were made on Eastern and Western composites of the 26 strains grown in the Uniform Regional Nurseries; on the wheats in the North Dakota and Montana Intrastate Nurseries; and those from station nurseries grown at Brookings, S. Dak.; Langdon and Dickinson, N. Dak.

There were also included 20 samples composited from samples of carlot receipts of wheat accumulated during a 90-day period of the 1950 crop movement by the Minneapolis, Duluth, Denver, and Great Falls offices of the Grain Branch, Production and Marketing Administration. These samples represent country-run receipts of the class hard red spring wheat and included only those lots that were graded No. 1 or better under the official grain standards of the United States. These are hereafter referred to as commercial samples. This is the twelfth season that such samples have been collected and tested.

## METHODS USED IN THE MILLING AND BAKING TESTS

After the removal of dockage the samples were prepared for milling by use of a milling separator and a scourer (both machines of experimental or laboratory size). The wheat samples were tempered in two stages. The water for the first temper was added 72 hours prior to milling and raised the

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<sup>2/</sup> Clark, J. A. Results of spring wheat varieties grown in cooperative plot and nursery experiments in the spring wheat region in 1950, with averages for 1938 to 1950. U. S. Dept. Agr. Res. Admin., B.P.I.S.&A.E., Div. Cereal Crops & Dis. 192 CC, 53 pp. April 1951. (Processed.)

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moisture content of the grain to between 13.0 and 16.0 percent or within 1 percent of the total moisture required depending upon the hardness of the variety. The additional 1 percent of water for the second temper was added 1/2 hour before milling and raised the moisture content of the grain to between 14.0 and 17.0 percent. The wheat was milled on an Allis-Chalmers experimental flour mill provided with three break rolls and one smooth roll. A 90 percent patent flour used in the chemical and bread-baking tests was made, discarding the low grade flour. The flour yield data in the tables are reported on the basis of a straight grade flour (100 percent) obtained from each sample.

The test-weight-per-bushel of each sample was determined in the laboratory on the dockage-free wheat. The protein and ash contents are reported on a 14.0 percent moisture basis and the flour yield on a moisture-free basis.

The hardness of the grain was determined by pearling 20 grams of dockage-free whole wheat for 1 minute in a model No. 38 Strong-Scott Pearler. The amount of material pearled off expressed as a percentage of the wheat is called the pearling index. This pearling index has been found useful not only as a guide in tempering the samples for milling, but also as a measure of the vitreous character of the grain. A low index figure indicates hard grain and a high index figure indicates soft grain.

The bread-baking tests on the 1950 samples (same as used on the 1944 to 1949 samples inclusive) were made by a rich formula with none or varying amounts of potassium bromate added.

The method used in 1950 with the various ingredients is shown in table 1.

Table 1.--Baking method used for samples of the 1950 crop.

| Ingredients and treatment              | Weight of ingredients, etc.  |
|--|--|
| Flour (grams)                          | 100.0  |
| Yeast (grams)                          | 2.0  |
| Salt (grams)                           | 1.5  |
| Sugar (grams)                          | 5.0  |
| Potassium bromate $\frac{1}{2}$ (mgs.) | Optimum  |
| Malted wheat flour (grams)             | .25  |
| Nonfat dry milk solids (grams)         | 4.0  |
| Shortening (grams)                     | 3.0  |
| Water absorption (percent)             | Optimum  |
| Mixing time (minutes)                  | Optimum  |
| Fermentation time (minutes)            | 180  |
| Handling of dough                      | 1st. punch after 105 minutes<br>2nd. punch after additional 50 minutes<br>Mold after additional 25 minutes<br>Proofing time - 55 minutes<br>Baked 25 minutes at 450°F. |

$\frac{1}{2}$  0 to 4 mgs. of potassium bromate used to obtain maximum loaf volume.



This baking procedure is based on the method of the American Association of Cereal Chemists, with certain modifications deemed necessary for unbleached, experimentally-milled flour.

A check or standard flour (12.6 percent protein and 0.48 percent ash on a 14.0 percent moisture basis) was included in the baking trials with each day's tests. The average loaf volume of baking tests made with the standard flour was 794 cc. and the standard error was 15.9 cc. On this basis the least significant difference between 2 single bakes is 45 cc.

#### EXPERIMENTAL RESULTS

The quality results for the plot and nursery composite and station samples are given in tables 2 to 8. The results for the commercial samples are shown in table 9, and the correlation and regression coefficients for 8 varieties and strains are shown in table 10. Summaries of new promising strains compared with Thatcher are shown in table 11. These tables are largely self-explanatory. The varieties or strains are arranged in the tables in order of their maximum loaf volume. Acre yields are included, where comparable, to assist in the interpretation of results.



Table 2.—Yield, milling, baking, and chemical results on the uniform varieties of hard red spring wheat grown at experiment stations from the Eastern and Western composites of the 1950 crop.

| Variety or<br>Cross                     | C. I.<br>No. | Acre | Yield | Test<br>Weight | Pearling<br>Index | Protein        |      | Flour |      | Absorp-<br>tion | Mixing<br>Time | Optimum Baking Methods |     |      |      |                   |       |         |
|---|--------------|------|-------|----------------|-------------------|----------------|------|-------|------|-----------------|----------------|------------------------|-----|------|------|-------------------|-------|---------|
|   |              |      |       |                |                   | Wheat<br>Yield | Ash  | Pot.  | Pct. |                 |                | Yield                  | Ash | Pot. | Pct. | Bromate<br>Volume | Color | Texture |
|   |              |      |       |                |                   |                |      |       |      |                 |                |                        |     |      |      |                   |       |         |
| Eastern Composite 1/                    |              |      |       |                |                   |                |      |       |      |                 |                |                        |     |      |      |                   |       |         |
| Lee                                     | 12488        | 29.1 | 60.7  | 31             | 13.9              | 13.2           | 74.3 | .44   | 64   | 3.0             | 0              | 850                    | 100 | 90   | 90   | 90                |       |         |
| Thatcher                                | 10003        | 23.8 | 58.5  | 24             | 12.9              | 12.4           | 74.7 | .49   | 62   | 3.5             | 0              | 824                    | 80  | 90   | 90   | 90                |       |         |
| Rival                                   | 11708        | 25.6 | 59.6  | 27             | 12.4              | 11.5           | 75.1 | .44   | 63   | 3.0             | 0              | 815                    | 85  | 90   | 90   | 90                |       |         |
| Cadet                                   | 12053        | 24.5 | 57.8  | 24             | 12.7              | 12.1           | 71.6 | .45   | 63   | 3.0             | 0              | 786                    | 90  | 90   | 90   | 90                |       |         |
| Mida                                    | 12008        | 27.2 | 60.8  | 28             | 12.8              | 11.7           | 74.2 | .44   | 62   | 2.5             | 0              | 752                    | 90  | 90   | 90   | 90                |       |         |
| Average                                 |              | 26.0 | 59.5  | 27             | 12.9              | 12.2           | 74.0 | .45   | 63   | 3.0             | 0              | 805                    | 89  | 90   | 90   | 90                |       |         |
| Range                                   |              | 5.3  | 3.0   | 7              | 1.5               | 1.7            | 3.5  | .05   | 2    | 1.0             | 0              | 98                     | 20  | 0    | 0    | 0                 |       |         |
| Western Composite 2/                    |              |      |       |                |                   |                |      |       |      |                 |                |                        |     |      |      |                   |       |         |
| Pilot                                   | 11945        | 24.0 | 58.5  | 27             | 15.2              | 14.3           | 71.9 | .44   | 64   | 2.5             | 0              | 974                    | 90  | 85   | 85   | 85                |       |         |
| Thatcher                                | 10003        | 26.3 | 59.2  | 28             | 15.3              | 14.6           | 73.3 | .45   | 64   | 2.5             | 1              | 969                    | 80  | 85   | 85   | 85                |       |         |
| Cadet                                   | 12053        | 24.5 | 58.0  | 27             | 15.3              | 14.8           | 72.8 | .47   | 66   | 2.5             | 1              | 956                    | 85  | 85   | 85   | 85                |       |         |
| Lee                                     | 12488        | 24.5 | 59.7  | 32             | 15.7              | 15.2           | 74.4 | .46   | 66   | 3.0             | 1              | 909                    | 85  | 85   | 85   | 85                |       |         |
| Mida                                    | 12008        | 23.6 | 61.0  | 30             | 14.9              | 14.1           | 74.9 | .46   | 62   | 2.0             | 1              | 862                    | 100 | 90   | 90   | 90                |       |         |
| Average                                 |              | 24.6 | 59.3  | 29             | 15.3              | 14.6           | 73.5 | .46   | 64   | 2.5             | .80            | 934                    | 90  | 86   | 86   | 86                |       |         |
| Range                                   |              | 2.7  | 3.0   | 5              | .8                | 1.1            | 3.0  | .02   | 4    | 1.0             | 1              | 112                    | 20  | 5    | 5    | 5                 |       |         |
| Average of Eastern & Western Composites |              |      |       |                |                   |                |      |       |      |                 |                |                        |     |      |      |                   |       |         |
| Thatcher                                | 10003        | 25.1 | 58.9  | 26             | 14.1              | 13.5           | 74.0 | .47   | 63   | 3.0             | 0.5            | 897                    | 80  | 88   | 88   | 88                |       |         |
| Lee                                     | 12488        | 26.8 | 60.2  | 31             | 14.8              | 14.2           | 74.4 | .45   | 65   | 3.0             | 0.5            | 880                    | 93  | 88   | 88   | 88                |       |         |
| Cadet                                   | 12053        | 24.5 | 57.9  | 25             | 14.0              | 13.5           | 72.2 | .46   | 65   | 2.8             | 0.5            | 871                    | 88  | 88   | 88   | 88                |       |         |
| Mida                                    | 12008        | 25.4 | 60.9  | 29             | 13.9              | 12.9           | 74.6 | .45   | 62   | 2.3             | 0.5            | 807                    | 95  | 90   | 90   | 90                |       |         |
| Average                                 |              | 25.5 | 59.5  | 28             | 14.2              | 13.5           | 73.8 | .46   | 64   | 2.8             | 0.5            | 864                    | 89  | 89   | 89   | 89                |       |         |
| Range                                   |              | 2.3  | 3.0   | 6              | .9                | 1.3            | 2.4  | .02   | 3    | .7              | 0              | 90                     | 15  | 2    | 2    | 2                 |       |         |

1/ From the Madison, Rosemont, Waseca, Morris, Crookston, Langdon, Fargo, Edgeley, Eureka, and Highmore stations.

2/ From the Dickinson, Minot, Williston, Havre, Moccasin, Sheridan, and Akron stations.



Table 3.—Yield, milling, baking, and chemical results for the leading hard red spring wheats grown in replicated "plots" in 1950.

| Variety or Cross             | State or N. No. | C. I. No. | Acre         | Yield       | Weight   | Test Index  | Pearling    | Protein     | Flour      | Absorption | Mixing Time | Optimum Baking Methods |            |          |          |
|------------------------------|-----------------|-----------|--------------|-------------|----------|-------------|-------------|-------------|------------|------------|-------------|------------------------|------------|----------|----------|
|                              |                 |           |              | Bu.         | Lbs.     | Pct.        | Pct.        | Pct.        | Pct.       | Pct.       | Min.        | Mg.                    | Cc         | Score    | Score    |
| Thatcher                     |                 | 10003     | 25.7         | 58.7        | 25       | 11.4        | 10.6        | 72.1        | .56        | 62         | 2.5         | 1                      | 729        | 65       | 80       |
| Cadet                        |                 | 12053     | 25.3         | 59.3        | 22       | 10.2        | 9.6         | 71.4        | .62        | 62         | 3.5         | 1                      | 695        | 75       | 80       |
| Mida                         |                 | 12008     | 28.1         | 60.7        | 27       | 10.9        | 10.1        | 72.8        | .60        | 62         | 2.5         | 0                      | 687        | 75       | 80       |
| Henry x Cadet                | 2239            | 12779     | 28.9         | 59.1        | 26       | 10.6        | 9.5         | 73.1        | .51        | 58         | 3.0         | 1                      | 683        | 70       | 80       |
| Lee                          |                 | 12488     | 25.9         | 60.9        | 26       | 11.3        | 10.1        | 74.3        | .54        | 62         | 2.5         | 0                      | 675        | 75       | 85       |
| Sturgeon                     |                 | 11703     | 23.3         | 61.2        | 29       | 10.9        | 10.0        | 75.2        | .61        | 58         | 3.0         | 1                      | 675        | 75       | 75       |
| Rushmore                     |                 | 12273     | 21.6         | 60.6        | 24       | 10.7        | 10.0        | 75.5        | .53        | 60         | 3.5         | 0                      | 669        | 70       | 75       |
| H-194-41                     | W. 246          | 12649     | 32.1         | 60.0        | 26       | 10.0        | 8.9         | 73.5        | .52        | 58         | 3.0         | 0                      | 666        | 75       | 75       |
| Rival                        |                 | 11708     | 25.8         | 60.3        | 28       | 10.3        | 9.5         | 76.1        | .59        | 60         | 2.5         | 0                      | 663        | 75       | 85       |
| Henry                        |                 | 12265     | 32.1         | 59.7        | 32       | 9.4         | 8.3         | 72.8        | .49        | 54         | 2.5         | 1                      | 660        | 65       | 80       |
| H-195-45                     | W. 242          | 12484     | 30.4         | 60.4        | 28       | 9.6         | 8.5         | 74.6        | .55        | 58         | 3.0         | 0                      | 651        | 75       | 80       |
| Average Range                |                 |           | 27.1<br>10.5 | 60.1<br>2.5 | 27<br>10 | 10.5<br>2.0 | 9.6<br>2.3  | 73.8<br>4.7 | .56<br>.11 | 59<br>8    | 2.9<br>1.0  | .45<br>1               | 678<br>78  | 72<br>10 | 80<br>10 |
| Morris, Minnesota            |                 |           |              |             |          |             |             |             |            |            |             |                        |            |          |          |
| Lee                          |                 | 12488     | 36.7         | 61.1        | 31       | 15.2        | 14.7        | 76.8        | .62        | 67         | 2.5         | 1                      | 859        | 85       | 85       |
| Rival                        |                 | 11708     | 36.1         | 59.8        | 28       | 12.6        | 12.1        | 77.3        | .61        | 66         | 2.5         | 0                      | 763        | 85       | 85       |
| Wahpeton                     |                 | 12772     | 31.2         | 61.2        | 27       | 12.3        | 11.8        | 76.1        | .55        | 66         | 2.5         | 0                      | 722        | 75       | 80       |
| Average Range                |                 |           | 34.7<br>5.5  | 60.7<br>1.4 | 29<br>4  | 13.4<br>2.9 | 12.9<br>2.9 | 76.7<br>1.1 | .59<br>.07 | 66<br>1    | 2.5<br>0    | .33<br>1               | 781<br>137 | 82<br>10 | 83<br>5  |
| Crockston, Minnesota         |                 |           |              |             |          |             |             |             |            |            |             |                        |            |          |          |
| Am <sup>10</sup> x Newthatch | 3681            | 12787     | 25.3         | 55.7        | 31       | 12.0        | 11.5        | 72.3        | .47        | 61         | 2.0         | 1                      | 853        | 90       | 85       |



Table 3.—Continued.

## Williston, North Dakota

| Variety or<br>Cross | State or<br>N. No. | C. I. Acre<br>: No. | Yield:Weight:Index<br>: : : Value | Pearl-<br>: ing | Protein | Flour |      | Absorp-<br>: tion | Mixing:<br>: : Time | Mg. | Optimum Baking Methods |     |                      |                      |                    |
|---------------------|--------------------|---------------------|-----------------------------------|-----------------|---------|-------|------|-------------------|---------------------|-----|------------------------|-----|----------------------|----------------------|--------------------|
|                     |                    |                     |                                   |                 |         | Pct.  | Pct. |                   |                     |     | Yield:                 | Ash | Bromate<br>: Volume: | Crumb: :<br>: Color: | Grain<br>: Texture |
|                     |                    |                     |                                   |                 |         |       |      |                   |                     |     |                        |     |                      |                      |                    |
| Bu.                 | Lbs.               | Pct.                | Pct.                              | Pct.            | Pct.    | Pct.  | Min. | Score             | Score               |     |                        |     |                      |                      |                    |
| Pilot               | 11945              | 26.0                | 58.0                              | 20              | 15.9    | 14.7  | 73.1 | .45               | 65                  | 3.5 | 0                      | 942 | 85                   | 90                   |                    |
| Lee                 | 12488              | 26.2                | 60.0                              | 33              | 15.8    | 15.4  | 74.5 | .45               | 67                  | 3.5 | 1                      | 931 | 95                   | 90                   |                    |
| 2744 x 2809         | Ns. 3274           | 12643               | 26.1                              | 59.6            | 33      | 16.3  | 15.4 | 75.5              | .47                 | 66  | 2.5                    | 1   | 928                  | 100                  | 85                 |
| Cadet               | 12053              | 27.0                | 59.0                              | 30              | 15.4    | 15.1  | 74.7 | .51               | 67                  | 3.0 | 1                      | 922 | 90                   | 90                   |                    |
| Redman              | 12496              | 27.3                | 58.8                              | 32              | 14.7    | 14.3  | 74.7 | .47               | 65                  | 3.0 | 1                      | 917 | 90                   | 85                   |                    |
| Rescue              | 12435              | 22.6                | 59.5                              | 35              | 15.9    | 15.6  | 73.6 | .46               | 63                  | 2.5 | 1                      | 905 | 80                   | 90                   |                    |
| Ceres               | 6900               | 27.1                | 60.5                              | 27              | 15.7    | 15.4  | 75.9 | .50               | 68                  | 3.5 | 1                      | 903 | 80                   | 85                   |                    |
| Thatcher            | 10003              | 29.0                | 59.3                              | 28              | 14.9    | 14.5  | 74.3 | .48               | 65                  | 3.0 | 0                      | 873 | 70                   | 90                   |                    |
| Rival               | 11708              | 26.0                | 60.0                              | 30              | 14.8    | 14.0  | 76.4 | .49               | 66                  | 3.5 | 1                      | 871 | 85                   | 90                   |                    |
| Red Thatcher        | 12913              | 28.8                | 60.4                              | 32              | 15.2    | 14.9  | 74.3 | .46               | 66                  | 2.5 | 1                      | 865 | 80                   | 85                   |                    |
| Mida                | 12008              | 25.7                | 61.3                              | 33              | 15.1    | 14.5  | 76.0 | .49               | 64                  | 2.0 | 1                      | 859 | 95                   | 90                   |                    |
| Average             |                    | 26.5                | 59.7                              | 31              | 15.4    | 14.9  | 74.8 | .48               | 66                  | 3.0 | .82                    | 901 | 85                   | 88                   |                    |
| Range               |                    | 6.4                 | 3.3                               | 8               | 1.6     | 1.6   | 3.3  | .06               | 5                   | 1.5 | 1                      | 83  | 30                   | 5                    |                    |

## Fargo, North Dakota

|                              |      |       |      |      |      |      |      |      |     |    |     |      |     |    |    |
|------------------------------|------|-------|------|------|------|------|------|------|-----|----|-----|------|-----|----|----|
| Am <sup>10</sup> x Newthatch | 3662 | 12908 | 36.4 | 58.0 | 26   | 14.3 | 13.9 | 75.7 | .44 | 64 | 2.0 | 1    | 916 | 90 | 90 |
| 1764 x Henry                 | 2211 | 12733 | 36.1 | 60.1 | 26   | 13.0 | 12.7 | 72.2 | .42 | 62 | 2.0 | 2    | 856 | 80 | 90 |
| Lee x 3175                   | 3654 | 12907 | 36.8 | 60.7 | 26   | 13.6 | 12.8 | 75.7 | .45 | 63 | 2.0 | 2    | 842 | 80 | 90 |
| Thatcher                     |      | 10003 | 32.5 | 58.0 | 22   | 13.0 | 12.6 | 73.9 | .43 | 60 | 2.5 | 1    | 830 | 75 | 85 |
| Redman                       |      | 12496 | 32.2 | 59.5 | 27   | 13.1 | 12.7 | 75.1 | .43 | 58 | 2.0 | 1    | 824 | 80 | 90 |
| Lee                          |      | 12488 | 39.4 | 61.2 | 29   | 13.8 | 13.2 | 75.2 | .46 | 62 | 2.0 | 2    | 818 | 85 | 80 |
| Cadet                        |      | 12053 | 28.5 | 56.8 | 22   | 13.1 | 12.5 | 74.1 | .50 | 63 | 2.5 | 1    | 815 | 85 | 85 |
| Rushmore                     |      | 12273 | 34.9 | 60.5 | 29   | 13.6 | 12.9 | 76.6 | .43 | 61 | 2.0 | 2    | 812 | 80 | 85 |
| Am <sup>10</sup> x Newthatch | 3681 | 12909 | 36.0 | 60.0 | 26   | 12.9 | 12.2 | 75.5 | .45 | 63 | 2.0 | 2    | 812 | 80 | 85 |
| 2744 x 2809                  | 3274 | 12643 | 28.2 | 59.1 | 26   | 12.7 | 11.7 | 76.3 | .43 | 61 | 2.0 | 2    | 801 | 85 | 90 |
| Pilot x Merit                | 2012 | 12493 | 32.7 | 59.1 | 20   | 12.7 | 11.8 | 73.7 | .45 | 64 | 2.0 | 0    | 798 | 85 | 85 |
| Premier                      |      | 11940 | 35.8 | 61.6 | 27   | 12.6 | 12.1 | 76.3 | .46 | 67 | 1.5 | 1    | 781 | 85 | 85 |
| Rival                        |      | 11708 | 28.9 | 59.0 | 23   | 12.2 | 11.6 | 75.4 | .44 | 64 | 2.0 | 0    | 781 | 80 | 85 |
| 1750 x Timstein              | 2313 | 12778 | 34.6 | 59.6 | 29   | 12.3 | 11.5 | 75.9 | .43 | 61 | 2.0 | 0    | 766 | 80 | 85 |
| Marquis                      |      | 3641  | 22.4 | 56.0 | 19   | 12.0 | 11.3 | 69.8 | .49 | 61 | 2.0 | 0    | 743 | 70 | 85 |
| Mida                         |      | 12008 | 32.2 | 60.3 | 26   | 12.0 | 11.5 | 77.0 | .47 | 62 | 2.0 | 1    | 726 | 80 | 80 |
| Ceres                        |      | 6900  | 25.8 | 58.1 | 19   | 11.9 | 11.2 | 71.8 | .45 | 62 | 2.0 | 0    | 709 | 70 | 85 |
| Wahpeton                     |      | 12772 | 30.3 | 60.3 | 24   | 11.9 | 11.2 | 75.1 | .44 | 65 | 2.0 | 0    | 668 | 75 | 75 |
| Chaffee                      |      | 12910 | 28.3 | 60.3 | 21   | 12.1 | 11.4 | 75.6 | .45 | 66 | 2.0 | 0    | 674 | 80 | 85 |
| Average                      |      | 32.2  | 59.4 | 25   | 12.8 | 12.1 | 74.8 | .45  | .45 | 63 | 2.0 | 1.00 | 788 | 80 | 85 |
| Range                        |      | 17.0  | 5.6  | 10   | 2.4  | 2.7  | 7.2  | .08  | .08 | 9  | 1.0 | 2    | 248 | 20 | 15 |



Table 3.—Continued.

## Edgeley, North Dakota

| Variety or<br>Cross | State or<br>N. No. | C. I. No. | Acres | Yield | Test<br>Weight | Pearl-<br>ing<br>Index | Protein | Flour<br>Yield | Ash  | Absorp-<br>tion | Mixing<br>Time | Optimum Baking Methods |        |       |
|---------------------|--------------------|-----------|-------|-------|----------------|------------------------|---------|----------------|------|-----------------|----------------|------------------------|--------|-------|
|                     |                    |           |       |       |                |                        |         |                |      |                 |                | Bromate                | Loaf   | Crumb |
|                     |                    |           |       | Bu.   | Lbs.           | Pct.                   | Pct.    | Pct.           | Pct. | Pct.            | Min.           | Mg.                    | Volume | Color |
| 1764 x Henry        | 2211               | 12733     | 19.2  | 58.4  | 34             | 15.5                   | 14.9    | 72.9           | .49  | 68              | 2.5            | 2                      | 959    | 80    |
| Lee                 |                    | 12488     | 22.9  | 58.8  | 34             | 15.0                   | 14.4    | 74.3           | .48  | 63              | 2.5            | 0                      | 936    | 90    |
| 2744 x 2809         | 3274               | 12643     | 19.1  | 57.8  | 35             | 14.5                   | 13.6    | 75.7           | .49  | 66              | 2.0            | 2                      | 923    | 85    |
| Lee x 3175          | 3654               | 12907     | 20.6  | 59.0  | 34             | 14.7                   | 14.0    | 74.9           | .50  | 64              | 2.5            | 1                      | 910    | 80    |
| Rival               |                    | 11708     | 21.6  | 57.2  | 31             | 13.4                   | 12.6    | 76.4           | .46  | 63              | 2.5            | 0                      | 883    | 85    |
| Thatcher            |                    | 10003     | 19.3  | 57.4  | 28             | 13.4                   | 12.7    | 74.4           | .48  | 62              | 2.5            | 1                      | 872    | 85    |
| Redman              |                    | 12496     | 21.5  | 57.8  | 33             | 13.0                   | 12.5    | 75.2           | .45  | 63              | 2.5            | 1                      | 856    | 85    |
| Rushmore            |                    | 12273     | 20.9  | 58.9  | 34             | 13.8                   | 13.1    | 75.8           | .45  | 62              | 2.0            | 0                      | 848    | 85    |
| Cadet               |                    | 12053     | 20.2  | 56.6  | 26             | 13.3                   | 12.7    | 72.6           | .46  | 62              | 2.5            | 1                      | 836    | 90    |
| Mida                |                    | 12008     | 24.5  | 59.7  | 33             | 13.4                   | 12.9    | 75.6           | .48  | 63              | 2.0            | 1                      | 818    | 85    |
| Pilot x Merit       | 2012               | 12493     | 22.4  | 59.1  | 25             | 13.5                   | 12.5    | 73.1           | .45  | 66              | 2.0            | 0                      | 810    | 80    |
| Wahpeton            |                    | 12772     | 20.6  | 58.6  | 28             | 12.9                   | 12.1    | 75.3           | .44  | 63              | 2.0            | 0                      | 769    | 75    |
| Average             |                    |           | 21.1  | 58.3  | 31             | 13.9                   | 13.2    | 74.7           | .47  | 64              | 2.3            | .75                    | 868    | 84    |
| Range               |                    |           | 5.4   | 3.1   | 10             | 2.6                    | 2.8     | 3.8            | .06  | 6               | 0.5            | 2                      | 190    | 15    |

## Langdon, North Dakota

|                              |      |       |      |      |    |      |      |      |     |    |     |     |     |    |
|------------------------------|------|-------|------|------|----|------|------|------|-----|----|-----|-----|-----|----|
| Cadet                        |      | 12053 | 38.2 | 59.0 | 20 | 12.0 | 11.4 | 74.7 | .48 | 68 | 2.5 | 2   | 738 | 75 |
| Pilot <sup>2</sup> x Merit   | 2174 | 12732 | 42.8 | 60.0 | 19 | 12.2 | 11.3 | 72.5 | .48 | 69 | 2.0 | 1   | 712 | 80 |
| 2744 x 2809                  | 3274 | 12643 | 43.0 | 60.2 | 27 | 12.7 | 12.1 | 74.3 | .44 | 67 | 2.0 | 1   | 704 | 85 |
| Am <sup>10</sup> x Newthatch | 3681 | 12787 | 46.0 | 60.3 | 25 | 12.4 | 11.8 | 73.8 | .46 | 66 | 2.0 | 0   | 698 | 80 |
| 1750 x Timstein              | 2313 | 12778 | 45.0 | 60.6 | 29 | 11.8 | 11.2 | 76.1 | .47 | 66 | 2.0 | 0   | 689 | 70 |
| Lee                          |      | 12488 | 50.0 | 61.5 | 27 | 12.6 | 12.2 | 73.0 | .45 | 68 | 2.0 | 1   | 680 | 90 |
| Rival                        |      | 11708 | 44.2 | 59.8 | 23 | 12.4 | 11.8 | 76.4 | .47 | 68 | 2.5 | 1   | 669 | 75 |
| Redman                       |      | 12496 | 40.7 | 60.0 | 27 | 11.5 | 11.1 | 74.6 | .44 | 68 | 2.5 | 0   | 662 | 75 |
| Mida                         |      | 12008 | 43.8 | 62.0 | 26 | 11.8 | 10.9 | 75.5 | .45 | 66 | 2.5 | 0   | 649 | 80 |
| Thatcher                     |      | 10003 | 38.3 | 60.3 | 22 | 11.5 | 10.7 | 75.2 | .43 | 64 | 2.5 | 0   | 646 | 75 |
| Average                      |      |       | 43.0 | 60.4 | 25 | 12.1 | 11.5 | 74.6 | .46 | 67 | 2.3 | .60 | 685 | 79 |
| Range                        |      |       | 11.8 | 3.0  | 10 | 1.2  | 1.5  | 3.9  | .05 | 5  | 0.5 | 2   | 92  | 20 |



Table 3.—Continued.

Dickinson, North Dakota

| Variety or<br>Cross        | State or<br>N. No. | C. I.<br>No. | Acre<br>Yield | Lbs.<br>Test | Pearl-<br>ing<br>Index | Protein | Flour<br>Yield | Ash  | Pet. | Absorp-<br>tion | Mixing<br>Time | Optimum Baking Methods |        |       |
|----------------------------|--------------------|--------------|---------------|--------------|------------------------|---------|----------------|------|------|-----------------|----------------|------------------------|--------|-------|
|                            |                    |              |               |              |                        |         |                |      |      |                 |                | Bromate                | Loaf   | Crumb |
|                            |                    |              |               |              |                        | Pct.    | Pct.           | Pct. | Pct. | Pct.            | Min.           | Mg.                    | Volume | Color |
|                            |                    |              |               |              |                        | Pct.    | Pct.           | Pct. | Pct. | Pct.            | Min.           | Mg.                    | Volume | Color |
| Pilot                      |                    | 11945        | 18.5          | 58.9         | 26                     | 15.4    | 14.9           | 73.2 | .45  | 63              | 2.0            | 1                      | 986    | 80    |
| Cadet                      |                    | 12053        | 21.2          | 58.1         | 28                     | 16.7    | 16.2           | 73.7 | .48  | 66              | 2.0            | 2                      | 980    | 85    |
| Rescue                     |                    | 12436        | 19.0          | 59.7         | 30                     | 15.6    | 15.2           | 73.0 | .46  | 61              | 2.5            | 1                      | 960    | 80    |
| 1764 x Henry               | 2211               | 12733        | 19.7          | 59.4         | 29                     | 16.0    | 15.5           | 69.9 | .41  | 67              | 2.5            | 2                      | 959    | 80    |
| Haynes Bluestem            |                    | 2674         | 16.7          | 58.7         | 30                     | 15.7    | 15.4           | 70.6 | .47  | 65              | 2.5            | 1                      | 951    | 80    |
| Pilot <sup>2</sup> x Merit | 2174               | 12732        | 18.9          | 59.3         | 22                     | 15.0    | 14.6           | 72.6 | .48  | 65              | 2.5            | 3                      | 948    | 80    |
| Lee                        |                    | 12488        | 19.1          | 60.0         | 31                     | 16.3    | 16.0           | 72.2 | .49  | 64              | 2.0            | 2                      | 934    | 85    |
| Ceres                      |                    | 6900         | 19.2          | 60.7         | 26                     | 15.9    | 15.2           | 72.0 | .47  | 65              | 2.5            | 1                      | 933    | 85    |
| Rival                      |                    | 11708        | 19.5          | 60.4         | 28                     | 15.0    | 14.5           | 76.5 | .49  | 65              | 2.0            | 1                      | 931    | 85    |
| Mida                       |                    | 12008        | 20.5          | 61.3         | 30                     | 14.6    | 14.4           | 71.5 | .46  | 66              | 2.0            | 2                      | 928    | 95    |
| Red Fife                   |                    | 3329         | 18.5          | 60.1         | 30                     | 14.6    | 14.4           | 71.5 | .46  | 65              | 2.0            | 2                      | 925    | 80    |
| 1750 x 1753                | 2115               | 12640        | 19.8          | 61.0         | 27                     | 16.3    | 16.0           | 73.7 | .45  | 64              | 2.0            | 3                      | 914    | 80    |
| Thatcher                   |                    | 10003        | 18.2          | 59.6         | 28                     | 15.0    | 14.5           | 71.7 | .43  | 63              | 2.5            | 1                      | 911    | 75    |
| Pilot x Merit              | 2012               | 12493        | 18.2          | 60.0         | 23                     | 14.8    | 14.4           | 72.7 | .45  | 68              | 2.5            | 1                      | 908    | 85    |
| Marquis                    |                    | 3641         | 17.8          | 59.7         | 28                     | 14.9    | 14.4           | 71.5 | .48  | 64              | 2.5            | 1                      | 905    | 80    |
| Regent x Mida              | 1843-41            | 12542        | 20.4          | 61.3         | 30                     | 14.8    | 14.3           | 74.8 | .45  | 63              | 2.5            | 2                      | 903    | 80    |
| Redman                     |                    | 12496        | 19.6          | 57.7         | 28                     | 15.1    | 14.7           | 72.8 | .45  | 64              | 2.5            | 1                      | 894    | 90    |
| 1552 x Mida                | 2083               | 12543        | 17.5          | 60.7         | 29                     | 14.4    | 14.0           | 71.5 | .44  | 62              | 2.0            | 2                      | 892    | 80    |
| 2744 x 2809                | 3274               | 12643        | 18.4          | 60.8         | 30                     | 15.6    | 15.2           | 74.9 | .44  | 63              | 2.0            | 1                      | 888    | 75    |
| Wahpeton                   |                    | 12772        | 18.3          | 61.1         | 31                     | 15.9    | 15.3           | 75.0 | .47  | 65              | 2.5            | 1                      | 876    | 75    |
| Rushmore                   |                    | 12273        | 18.9          | 60.7         | 31                     | 15.2    | 14.7           | 75.1 | .45  | 62              | 2.0            | 1                      | 868    | 80    |
| Average                    |                    |              | 18.9          | 60.0         | 28                     | 15.4    | 15.0           | 73.1 | .46  | 64              | 2.3            | 1.52                   | 924    | 82    |
| Range                      |                    |              | 4.5           | 3.6          | 9                      | 2.3     | 2.2            | 6.6  | .08  | 7               | 0.5            | 2                      | 118    | 20    |



Table 3.—Continued.

Minot, North Dakota

| Variety or Cross | State or N. No. | C. I. No. | Acre | Yield | Test Weight | Pearl- ing Index | Protein | Flour | Absorp- tion | Mixing Time | Optimum Baking Methods |        |                |
|------------------|-----------------|-----------|------|-------|-------------|------------------|---------|-------|--------------|-------------|------------------------|--------|----------------|
|                  |                 |           |      |       |             |                  |         |       |              |             | Bromate                | Loaf   | Crumb: Grain   |
|                  |                 |           | Bu.  | Lbs.  | Pct.        | Pct.             | Pct.    | Pct.  | Pct.         | Min.        | Mg.                    | Volume | Color: Texture |
| Thatcher x Apex  | Sask. 2176      | 12639     | 21.6 | 60.5  | 31          | 14.8             | 14.5    | 75.7  | .51          | 68          | 2.5                    | 2      | 966 90 80      |
| 2744 x 2809      | Ns. 3274        | 12643     | 23.2 | 59.6  | 35          | 15.7             | 15.0    | 73.9  | .51          | 69          | 2.0                    | 2      | 956 85 90      |
| 1764 x Henry     | NN 2211         | 12733     | 23.3 | 59.2  | 32          | 16.7             | 16.4    | 74.0  | .47          | 69          | 2.5                    | 2      | 951 75 85      |
| Redman           |                 | 12496     | 21.6 | 60.0  | 35          | 14.6             | 14.3    | 74.7  | .50          | 66          | 2.5                    | 2      | 923 100 85     |
| Rushmore         |                 | 12273     | 23.3 | 61.0  | 37          | 15.5             | 15.1    | 77.9  | .53          | 64          | 2.5                    | 1      | 908 85 90      |
| Rescue           |                 | 12435     | 16.0 | 57.5  | 28          | 14.1             | 13.6    | 72.3  | .48          | 63          | 2.0                    | 0      | 906 75 85      |
| Lee              |                 | 12488     | 23.9 | 59.8  | 33          | 16.0             | 15.7    | 72.9  | .49          | 65          | 2.0                    | 2      | 905 95 90      |
| Pilot            |                 | 11945     | 16.8 | 58.5  | 29          | 14.5             | 13.7    | 73.0  | .47          | 64          | 2.0                    | 1      | 903 80 90      |
| Amlo x Newthatch | Ns. 3681        | 12787     | 27.2 | 59.5  | 33          | 16.2             | 15.7    | 75.4  | .52          | 66          | 2.0                    | 2      | 898 90 90      |
| Pilot x Merit    | NN 2012         | 12493     | 23.6 | 60.0  | 25          | 15.1             | 14.1    | 72.6  | .53          | 65          | 2.5                    | 1      | 898 75 90      |
| Rival            |                 | 11708     | 24.5 | 60.1  | 30          | 14.3             | 14.0    | 76.2  | .57          | 70          | 3.0                    | 2      | 896 85 85      |
| Ceres            |                 | 6900      | 20.9 | 60.1  | 26          | 14.2             | 13.8    | 74.9  | .51          | 66          | 2.0                    | 1      | 894 80 90      |
| Mida             |                 | 12008     | 24.6 | 61.1  | 32          | 15.0             | 14.6    | 75.4  | .54          | 66          | 2.0                    | 2      | 893 90 80      |
| Thatcher         |                 | 1003      | 24.2 | 59.3  | 28          | 14.6             | 14.2    | 73.9  | .53          | 66          | 2.0                    | 2      | 862 70 90      |
| Wahpeton         |                 | 12772     | 28.8 | 61.8  | 32          | 14.4             | 14.2    | 76.7  | .52          | 69          | 2.0                    | 1      | 853 75 80      |
| Cadet            |                 | 12053     | 20.1 | 58.0  | 26          | 14.3             | 14.0    | 74.1  | .53          | 66          | 2.5                    | 1      | 842 80 90      |

|         |  |  |      |      |    |      |      |      |     |    |     |      |           |
|---------|--|--|------|------|----|------|------|------|-----|----|-----|------|-----------|
| Average |  |  | 22.7 | 59.8 | 31 | 15.0 | 14.6 | 74.6 | .51 | 66 | 2.3 | 1.50 | 903 83 87 |
| Range   |  |  | 12.8 | 4.3  | 12 | 2.6  | 2.8  | 5.6  | .10 | 7  | 1.0 | 2    | 124 30 10 |

Eureka, South Dakota

|                    |      |       |      |      |    |      |      |      |     |    |     |   |            |
|--------------------|------|-------|------|------|----|------|------|------|-----|----|-----|---|------------|
| 1764 x Henry       | 2211 | 12733 | 17.3 | 59.0 | 32 | 13.9 | 13.0 | 71.3 | .42 | 60 | 2.5 | 1 | 856 85 90  |
| Triunfo x Thatcher | 630  | 12625 | 16.1 | 60.5 | 32 | 13.3 | 12.2 | 71.8 | .52 | 58 | 2.0 | 1 | 806 90 90  |
| Rushmore           |      | 12273 | 16.9 | 60.1 | 31 | 12.5 | 11.8 | 78.3 | .50 | 60 | 3.0 | 0 | 786 80 90  |
| H.R.P. x Clarendon | 2202 | 12731 | 16.3 | 60.6 | 34 | 13.1 | 12.4 | 76.3 | .41 | 60 | 2.5 | 1 | 778 100 90 |
| Cadet              |      | 12045 | 14.5 | 57.7 | 24 | 13.2 | 12.4 | 73.6 | .55 | 62 | 3.0 | 1 | 758 90 90  |
| Rival              |      | 11708 | 15.9 | 59.2 | 29 | 11.9 | 10.9 | 76.5 | .49 | 63 | 3.5 | 0 | 747 80 90  |
| Ceres              |      | 6900  | 14.6 | 58.8 | 24 | 12.3 | 11.6 | 72.9 | .46 | 62 | 3.0 | 0 | 738 80 90  |
| Lee                |      | 12488 | 15.9 | 60.8 | 31 | 12.8 | 11.8 | 74.3 | .47 | 62 | 3.0 | 0 | 735 90 90  |
| Pilot              |      | 11945 | 15.0 | 59.8 | 26 | 11.4 | 10.4 | 74.1 | .46 | 60 | 2.5 | 0 | 718 75 85  |
| Thatcher           |      | 10003 | 17.4 | 59.5 | 24 | 12.1 | 11.3 | 74.1 | .50 | 60 | 3.0 | 0 | 696 75 80  |
| Mida               |      | 12008 | 17.6 | 60.8 | 31 | 11.4 | 10.4 | 75.3 | .44 | 60 | 3.0 | 0 | 666 75 85  |

|         |  |  |      |      |    |      |      |      |     |    |     |     |           |
|---------|--|--|------|------|----|------|------|------|-----|----|-----|-----|-----------|
| Average |  |  | 16.1 | 59.7 | 29 | 12.5 | 11.7 | 74.4 | .47 | 61 | 2.8 | .36 | 753 84 88 |
| Range   |  |  | 3.1  | 3.1  | 10 | 2.5  | 2.6  | 7.0  | .14 | 5  | 1.5 | 1   | 190 25 10 |



Table 3.--Continued.

Brookings, South Dakota

| Variety or<br>Cross | : State or<br>: N. No. | : C. I. Acre<br>: No. | : Yield:<br>: Bu. | : Test :<br>: Lbs. | : Pearl-<br>: ing | : Protein | : Flour<br>: Yield | : Ash | : Absorp-<br>: tion | : Mixing:<br>: Time | : Mg. | Optimum Baking Methods |                      |
|---------------------|------------------------|-----------------------|-------------------|--------------------|-------------------|-----------|--------------------|-------|---------------------|---------------------|-------|------------------------|----------------------|
|                     |                        |                       |                   |                    |                   |           |                    |       |                     |                     |       | Loaf :Crumb: Grain     | Volume:Color:Texture |
| Triunfo x Thatcher  | 630                    | 12625                 | 31.6              | 61.4               | 31                | 14.9      | 13.5               | 72.0  | .43                 | 60                  | 2.0   | 945                    | 90 80                |
| 1764 x Henry        | 2211                   | 12733                 | 29.3              | 59.1               | 26                | 13.6      | 13.0               | 72.1  | .44                 | 66                  | 3.0   | 848                    | 85 90                |
| Redman              |                        | 12496                 | 26.2              | 58.2               | 28                | 13.3      | 12.8               | 75.0  | .46                 | 64                  | 3.0   | 815                    | 85 90                |
| Triunfo x Thatcher  | 343                    | 12497                 | 30.1              | 61.8               | 36                | 14.1      | 13.0               | 72.7  | .49                 | 60                  | 1.5   | 815                    | 90 90                |
| Lee                 |                        | 12488                 | 32.8              | 61.5               | 28                | 14.0      | 13.3               | 75.4  | .45                 | 67                  | 3.5   | 803                    | 85 95                |
| H.R.P. x Clarendon  | 1091                   | 12723                 | 25.0              | 61.8               | 38                | 14.1      | 13.0               | 73.7  | .43                 | 60                  | 2.0   | 795                    | 90 90                |
| H.R.P. x Clarendon  | 2202                   | 12731                 | 32.4              | 61.5               | 34                | 13.5      | 12.9               | 77.4  | .40                 | 60                  | 2.0   | 787-                   | 90 90                |
| Cadet               |                        | 12045                 | 25.4              | 58.5               | 23                | 13.0      | 12.1               | 72.3  | .52                 | 66                  | 3.0   | 781                    | 80 90                |
| Pilot               |                        | 11945                 | 25.4              | 58.9               | 23                | 12.9      | 11.7               | 73.6  | .47                 | 62                  | 2.5   | 772                    | 70 90                |
| Rushmore            |                        | 12273                 | 27.7              | 60.8               | 29                | 13.1      | 12.5               | 75.9  | .48                 | 62                  | 4.0   | 758                    | 80 85                |
| Thatcher            |                        | 10003                 | 26.9              | 59.0               | 23                | 12.6      | 11.8               | 73.8  | .49                 | 64                  | 3.0   | 747                    | 75 85                |
| Mida                |                        | 12008                 | 30.8              | 61.5               | 26                | 12.2      | 11.2               | 75.5  | .49                 | 64                  | 2.5   | 732                    | 90 90                |
| Rival               |                        | 11708                 | 28.1              | 60.1               | 24                | 12.1      | 11.5               | 77.4  | .52                 | 63                  | 4.0   | 732                    | 75 85                |
| Ceres               |                        | 6900                  | 26.5              | 59.1               | 22                | 12.0      | 11.0               | 72.7  | .44                 | 64                  | 3.0   | 729                    | 70 85                |
| Average             |                        |                       | 28.4              | 60.2               | 28                | 13.2      | 12.4               | 74.3  | .47                 | 63                  | 2.8   | 790                    | 83 88                |
| Range               |                        |                       | 7.8               | 3.6                | 16                | 2.9       | 2.5                | 5.4   | .12                 | 7                   | 2.5   | 216                    | 20 15                |

Higbmore, South Dakota

|                    |      |       |      |      |    |      |      |      |     |    |     |      |       |
|--------------------|------|-------|------|------|----|------|------|------|-----|----|-----|------|-------|
| 1764 x Henry       | 2211 | 12733 | 12.5 | 59.4 | 30 | 15.8 | 15.4 | 73.4 | .48 | 67 | 3.0 | 1010 | 85 90 |
| Thatcher           |      | 10003 | 11.3 | 60.8 | 27 | 15.5 | 15.0 | 72.9 | .46 | 66 | 3.0 | 1009 | 95 90 |
| Rushmore           |      | 12273 | 12.6 | 60.4 | 31 | 15.7 | 15.0 | 75.9 | .48 | 64 | 3.5 | 959  | 90 90 |
| Triunfo x Thatcher | 630  | 12625 | 9.8  | 60.5 | 32 | 16.0 | 15.2 | 73.0 | .57 | 62 | 1.5 | 945  | 85 80 |
| Lee                |      | 12488 | 10.4 | 61.0 | 30 | 16.1 | 15.2 | 72.3 | .50 | 66 | 3.0 | 940  | 95 95 |
| Rival              |      | 11708 | 11.7 | 60.8 | 26 | 15.3 | 14.4 | 76.0 | .54 | 65 | 3.5 | 917  | 90 90 |
| H.R.P. x Clarendon | 2202 | 12731 | 13.0 | 61.6 | 31 | 15.1 | 14.6 | 76.7 | .44 | 62 | 2.0 | 917  | 95 85 |
| Pilot              |      | 11945 | 13.1 | 60.4 | 25 | 15.3 | 14.2 | 70.9 | .51 | 63 | 2.0 | 915  | 90 90 |
| Ceres              |      | 6900  | 14.0 | 61.8 | 27 | 15.0 | 14.5 | 67.7 | .51 | 69 | 3.0 | 906  | 75 90 |
| Cadet              |      | 12045 | 15.1 | 59.5 | 24 | 14.9 | 14.1 | 72.6 | .53 | 69 | 3.5 | 871  | 95 85 |
| Mida               |      | 12008 | 12.2 | 61.9 | 28 | 15.0 | 14.1 | 74.9 | .51 | 64 | 2.5 | 850  | 95 90 |
| Average            |      |       | 12.3 | 60.7 | 28 | 15.4 | 14.7 | 73.3 | .50 | 65 | 2.8 | 931  | 90 87 |
| Range              |      |       | 5.3  | 2.5  | 8  | 1.2  | 1.3  | 9.0  | .13 | 7  | 2.0 | 160  | 20 15 |



Table 3.—Continued.

## Havre, Montana

| Variety or<br>Cross | State or<br>N. No. | C. I.<br>No. | Acre<br>Yield | Test<br>Weight | Pearl-<br>Index | Protein | Flour |       | Absorp-<br>tion | Mixing<br>Time | Optimum Baking Methods |        |       |
|---------------------|--------------------|--------------|---------------|----------------|-----------------|---------|-------|-------|-----------------|----------------|------------------------|--------|-------|
|                     |                    |              |               |                |                 |         | Wheat | Yield |                 |                | Bromate                | Loaf   | Crumb |
|                     |                    |              | Bu.           | Lbs.           | Pct.            | Pct.    | Pct.  | Pct.  | Pct.            | Min.           | Mg.                    | Volume | Color |
| Rescue              |                    | 12435        | 18.6          | 54.6           | 31              | 17.4    | 17.0  | 71.0  | .52             | 65             | 1                      | 1068   | 70    |
| Pilot               |                    | 11945        | 21.5          | 52.8           | 25              | 16.8    | 16.1  | 69.0  | .48             | 65             | 2                      | 1066   | 75    |
| Reward              |                    | 8182         | 18.7          | 58.8           | 30              | 17.6    | 16.9  | 72.2  | .50             | 66             | 1                      | 1035   | 90    |
| Thatcher            |                    | 10003        | 20.3          | 53.4           | 25              | 17.0    | 16.1  | 68.8  | .50             | 67             | 1                      | 1007   | 70    |
| Marquis             |                    | 3641         | 17.5          | 56.6           | 28              | 17.1    | 16.6  | 72.3  | .56             | 66             | 1                      | 995    | 80    |
| Cadet               |                    | 12053        | 19.3          | 53.6           | 25              | 16.8    | 16.4  | 71.5  | .58             | 68             | 1                      | 956    | 90    |
| Supreme             |                    | 8026         | 20.7          | 55.0           | 27              | 15.8    | 15.1  | 71.9  | .49             | 66             | 3                      | 951    | 85    |
| Ceres               |                    | 6900         | 19.5          | 56.5           | 23              | 16.4    | 15.8  | 70.4  | .54             | 70             | 1                      | 923    | 80    |
| Lee                 |                    | 12488        | 20.2          | 56.6           | 28              | 16.1    | 15.6  | 72.9  | .52             | 68             | 2                      | 919    | 90    |
| Merit x Pilot       | 1860               | 12355        | 20.1          | 54.6           | 22              | 16.3    | 15.3  | 70.6  | .54             | 68             | 2                      | 910    | 80    |
| Pilot x Mida        | 1953               | 12455        | 20.0          | 59.2           | 26              | 14.7    | 14.1  | 72.3  | .44             | 63             | 2                      | 859    | 85    |
| Mida                |                    | 12008        | 18.9          | 57.8           | 27              | 14.7    | 14.3  | 71.8  | .55             | 67             | 1                      | 810    | 90    |
| Average             |                    |              | 19.6          | 55.8           | 26              | 16.4    | 15.8  | 71.2  | .52             | 67             | 1.50                   | 958    | 82    |
| Range               |                    |              | 4.0           | 6.4            | 9               | 2.9     | 2.9   | 4.1   | .10             | 7              | 2                      | 258    | 20    |

## Moccasin, Montana

|               |      |       |      |      |    |      |      |      |     |    |     |     |    |    |
|---------------|------|-------|------|------|----|------|------|------|-----|----|-----|-----|----|----|
| Rescue        |      | 12435 | 38.3 | 62.8 | 38 | 14.9 | 14.5 | 75.3 | .49 | 63 | 1   | 989 | 75 | 90 |
| Reward        |      | 8182  | 29.4 | 63.5 | 34 | 16.3 | 16.0 | 72.1 | .47 | 64 | 1   | 971 | 85 | 90 |
| Pilot         |      | 11945 | 39.2 | 62.2 | 31 | 14.8 | 14.0 | 73.2 | .43 | 64 | 1   | 928 | 80 | 90 |
| Lee           |      | 12488 | 38.7 | 61.5 | 32 | 15.4 | 14.9 | 74.0 | .52 | 72 | 1   | 909 | 90 | 85 |
| Supreme       |      | 8026  | 38.3 | 61.7 | 34 | 14.2 | 13.6 | 73.4 | .50 | 70 | 1   | 901 | 75 | 85 |
| Marquis       |      | 3641  | 33.3 | 62.0 | 31 | 14.7 | 14.2 | 73.0 | .51 | 65 | 1   | 885 | 75 | 85 |
| Thatcher      |      | 10003 | 40.1 | 62.2 | 33 | 15.4 | 14.8 | 74.2 | .49 | 64 | 1   | 873 | 75 | 85 |
| Merit x Pilot | 1860 | 12355 | 36.5 | 60.9 | 29 | 15.3 | 15.0 | 73.4 | .54 | 70 | 1   | 859 | 85 | 85 |
| Ceres         |      | 6900  | 38.3 | 62.5 | 29 | 15.0 | 14.2 | 74.2 | .52 | 69 | 1   | 845 | 70 | 80 |
| Pilot x Mida  | 1756 | 12303 | 38.8 | 63.9 | 30 | 14.6 | 14.1 | 72.3 | .47 | 67 | 1   | 842 | 85 | 85 |
| Mida          |      | 12008 | 37.6 | 62.1 | 33 | 14.8 | 14.2 | 74.8 | .49 | 63 | 1   | 812 | 85 | 85 |
| Cadet         |      | 12053 | 36.1 | 61.7 | 28 | 14.4 | 13.9 | 71.7 | .49 | 68 | 0   | 804 | 75 | 85 |
| Average       |      |       | 37.1 | 62.3 | 32 | 15.0 | 14.5 | 73.5 | .49 | 67 | .92 | 885 | 80 | 86 |
| Range         |      |       | 6.8  | 3.0  | 10 | 2.1  | 2.4  | 3.6  | .11 | 9  | 1   | 185 | 20 | 10 |

| Variety or<br>Cross | State or<br>N. No. | C. I.<br>No. | Acre<br>Yield | Test<br>Weight | Pearl-<br>Index | Protein | Flour |       | Absorp-<br>tion | Mixing<br>Time | Optimum Baking Methods |        |         |
|---------------------|--------------------|--------------|---------------|----------------|-----------------|---------|-------|-------|-----------------|----------------|------------------------|--------|---------|
|                     |                    |              |               |                |                 |         | Wheat | Yield |                 |                | Bromate                | Loaf   | Crumb   |
|                     |                    |              | Bu.           | Lbs.           | Pct.            | Pct.    | Pct.  | Pct.  | Pct.            | Min.           | Mg.                    | Volume | Color   |
|                     |                    |              |               |                |                 |         |       |       |                 |                |                        | Score  | Texture |
| 1764 x Henry        | 2232               | 12637        | 33.9          | 57.7           | 29              | 15.5    | 14.7  | 71.8  | .41             | 65             | 3                      | 928    | 80      |
| Henry x Cadet       | 2239               | 12779        | 35.7          | 58.1           | 35              | 15.3    | 14.8  | 72.4  | .42             | 66             | 2                      | 922    | 80      |
| Cadet               |                    | 12053        | 40.3          | 58.6           | 30              | 15.0    | 14.5  | 73.7  | .45             | 67             | 1                      | 890    | 85      |
| 1764 x 1753         | 2213               | 12738        | 30.1          | 58.3           | 31              | 14.9    | 14.1  | 71.2  | .41             | 64             | 1                      | 883    | 80      |
| 1764 x Henry        | 2211               | 12733        | 38.2          | 60.4           | 31              | 15.4    | 15.1  | 71.8  | .41             | 65             | 2                      | 879    | 85      |
| Lee                 |                    | 12488        | 38.2          | 59.3           | 35              | 16.0    | 15.1  | 72.5  | .46             | 64             | 1                      | 871    | 85      |
| 1552 x Mida         | 1924               | 12483        | 37.4          | 61.1           | 30              | 15.2    | 14.4  | 74.9  | .47             | 65             | 2                      | 865    | 90      |
| Pilot               |                    | 11945        | 38.8          | 58.3           | 30              | 15.1    | 14.0  | 71.8  | .42             | 63             | 0                      | 864    | 85      |
| Pilot x Thatcher    | 2030               | 12736        | 34.8          | 59.4           | 26              | 15.2    | 14.1  | 72.4  | .43             | 65             | 0                      | 862    | 75      |
| Marquis             |                    | 3641         | 35.6          | 60.0           | 32              | 14.8    | 14.3  | 72.7  | .46             | 65             | 0                      | 842    | 80      |
| 1552 x Mida         | 2083               | 12543        | 42.5          | 60.3           | 34              | 14.3    | 13.7  | 72.6  | .41             | 64             | 1                      | 842    | 80      |
| 1691 x 1756         | 2105               | 12541        | 33.6          | 60.0           | 33              | 15.3    | 14.5  | 72.4  | .39             | 66             | 1                      | 842    | 75      |
| Rushmore            |                    | 12273        | 35.6          | 59.8           | 35              | 14.7    | 14.3  | 75.0  | .43             | 65             | 0                      | 836    | 85      |
| Henry x 1907        | 2242               | 12777        | 33.5          | 58.5           | 32              | 15.8    | 15.1  | 71.0  | .44             | 65             | 0                      | 824    | 80      |
| 1750 x 1753         | 2095               | 12551        | 34.3          | 60.8           | 33              | 15.3    | 14.7  | 71.3  | .40             | 66             | 1                      | 818    | 85      |
| Thatcher            |                    | 10003        | 44.6          | 61.3           | 30              | 14.3    | 13.8  | 74.3  | .45             | 63             | 2                      | 812    | 80      |
| Mida                |                    | 12008        | 32.5          | 62.1           | 31              | 15.1    | 14.4  | 75.0  | .42             | 65             | 0                      | 807    | 85      |
| Pilot x Merit       | 1996               | 12648        | 37.9          | 60.8           | 29              | 14.0    | 13.3  | 74.1  | .41             | 65             | 2                      | 804    | 85      |
| Ceres               |                    | 6900         | 36.7          | 60.7           | 31              | 14.3    | 14.0  | 74.7  | .45             | 65             | 0                      | 795    | 80      |
| 1750 x 1753         | 2092               | 12549        | 35.6          | 59.4           | 33              | 15.3    | 14.3  | 72.4  | .41             | 64             | 0                      | 786    | 85      |
| Pilot2 x Merit      | 2174               | 12732        | 40.9          | 59.1           | 27              | 13.9    | 13.0  | 74.3  | .47             | 66             | 2                      | 767    | 85      |
| Pilot x Merit       | 1898               | 12442        | 31.3          | 60.1           | 21              | 14.7    | 13.8  | 72.9  | .49             | 67             | 2                      | 764    | 75      |
| 1590 x Thatcher     | 1956               | 12630        | 36.7          | 60.7           | 33              | 14.0    | 13.3  | 75.1  | .44             | 65             | 2                      | 715    | 80      |
| Average             |                    | 36.5         | 59.8          |                | 31              | 14.9    | 14.2  | 73.1  | .43             | 65             | 1.9                    | 836    | 82      |
| Range               |                    | 14.5         | 4.4           |                | 14              | 2.1     | 2.1   | 4.1   | .10             | 4              | 3                      | 213    | 15      |

| Akron, Colorado |       |     |      |    |      |      |      |     |    |     |     |      |    |
|-----------------|-------|-----|------|----|------|------|------|-----|----|-----|-----|------|----|
| Reward          | 8182  | 4.1 | 60.4 | 26 | 16.2 | 15.5 | 72.1 | .60 | 60 | 2.5 | 1   | 1067 | 75 |
| Cadet           | 12053 | 7.5 | 55.9 | 23 | 15.3 | 14.7 | 71.7 | .56 | 62 | 3.0 | 1   | 968  | 80 |
| Pilot2 x Merit  | 2174  | 4.2 | 59.5 | 22 | 14.8 | 13.9 | 74.6 | .61 | 64 | 3.0 | 0   | 916  | 80 |
| Pilot           | 11945 | 7.0 | 58.0 | 22 | 14.4 | 13.4 | 74.1 | .53 | 60 | 3.5 | 0   | 901  | 90 |
| Thatcher        | 10003 | 7.9 | 58.5 | 25 | 14.5 | 14.0 | 74.5 | .50 | 60 | 3.0 | 0   | 888  | 80 |
| Lee             | 12488 | 5.5 | 59.2 | 29 | 14.5 | 14.0 | 74.8 | .59 | 63 | 3.5 | 2   | 865  | 80 |
| Mida            | 12008 | 5.6 | 60.1 | 25 | 13.9 | 12.9 | 74.0 | .53 | 60 | 3.0 | 1   | 807  | 85 |
| Pilot x Mida    | 12445 | 4.9 | 60.9 | 24 | 13.5 | 12.5 | 75.2 | .52 | 62 | 3.0 | 0   | 803  | 80 |
| 1750 x 1753     | 12549 | 3.4 | 60.0 | 25 | 14.3 | 13.2 | 74.3 | .61 | 60 | 3.0 | 0   | 775  | 75 |
| Average         |       | 5.6 | 59.2 | 25 | 14.6 | 13.8 | 73.9 | .56 | 61 | 3.1 | .56 | 888  | 81 |
| Range           |       | 4.5 | 5.0  | 7  | 2.7  | 3.0  | 3.5  | .11 | 4  | 1   | 2   | 292  | 15 |



Table 4.--Yield, milling, baking and chemical results on hard red spring wheats grown in replicated "plots" composited from Minnesota stations.

Minnesota Intrastate 1/

| Variety or Cross     | State or N. No. | C. I. No. | Acres | Yield: Bu. | Weight: Lbs. | Test: Pct. | Pearl-ing: Pct. | Protein: Pct. | Flour: Pct. | Ash: Pct. | Absorp-tion: Pct. | Min. Time | Maxing: Time | Optimum Baking Methods: Broomate: Volume: Color: Texture | Loaf: Crumb: Grain | Score |
|----------------------|-----------------|-----------|-------|------------|--------------|------------|-----------------|---------------|-------------|-----------|-------------------|-----------|--------------|--|--------------------|-------|
| Timstein x Newthatch | 2806            | 12740     | 27.4  | 58.0       | 26           | 14.4       | 14.1            | 74.2          | .56         | .64       | 2.0               | 2.5       | 1            | 931  | 95                 | 90    |
| Timstein x Newthatch | 2805            | 12768     | 27.4  | 57.7       | 27           | 15.4       | 14.6            | 72.9          | .58         | .64       | 2.5               | 2.5       | 2            | 898  | 85                 | 90    |
| Thatcher x Surpresa  | 2824            | 12641     | 30.2  | 61.5       | 32           | 14.0       | 13.7            | 74.8          | .47         | .63       | 2.0               | 2.5       | 1            | 896  | 85                 | 85    |
| Timstein x Mida      | 2804            | 12771     | 29.0  | 58.8       | 28           | 13.6       | 13.0            | 73.2          | .54         | .68       | 2.5               | 2.5       | 1            | 833  | 85                 | 90    |
| Lee                  | 12488           | 30.8      | 59.5  | 30         | 14.1         | 13.6       | 73.2            | .50           | .66         | 2.5       | 2.5               | 2.5       | 1            | 360  | 90                 | 90    |
| Rushmore             | 12273           | 29.2      | 59.2  | 30         | 13.2         | 12.7       | 75.5            | .52           | .62         | 2.5       | 2.5               | 2.5       | 1            | 859  | 80                 | 85    |
| Cadet                | 12053           | 25.9      | 56.3  | 23         | 12.7         | 12.1       | 71.4            | .53           | .66         | 2.5       | 2.5               | 2.5       | 1            | 856  | 80                 | 95    |
| Pilot                | 11945           | 26.2      | 57.2  | 23         | 12.6         | 11.7       | 71.9            | .50           | .60         | 2.0       | 2.0               | 2.0       | 1            | 842  | 75                 | 90    |
| Henry                | 12265           | 33.8      | 59.3  | 33         | 12.3         | 11.4       | 75.6            | .50           | .61         | 2.0       | 2.0               | 2.5       | 1            | 833  | 75                 | 80    |
| Thatcher             | 10003           | 22.5      | 56.5  | 22         | 13.0         | 12.8       | 72.9            | .60           | .63         | 2.5       | 2.5               | 2.5       | 1            | 815  | 75                 | 90    |
| Rival                | 11708           | 26.5      | 58.2  | 26         | 12.1         | 11.5       | 75.5            | .51           | .63         | 2.5       | 2.5               | 2.5       | 1            | 801  | 80                 | 85    |
| Pilot x Mida         | 12445           | 29.2      | 60.4  | 25         | 12.0         | 11.5       | 72.7            | .52           | .63         | 2.0       | 2.0               | 2.0       | 1            | 792  | 80                 | 80    |
| Mida                 | 12008           | 27.6      | 59.3  | 27         | 12.3         | 11.6       | 74.7            | .53           | .64         | 2.5       | 2.5               | 2.5       | 0            | 716  | 85                 | 85    |
| Average              |                 | 28.1      | 58.6  | 27         | 13.2         | 12.6       | 73.7            | .53           | .64         | 2.3       | 2.3               | 2.3       | 1.00         | 845  | 82                 | 87    |
| Range                |                 | 11.3      | 5.2   | 11         | 3.4          | 3.2        | 4.2             | .13           | .8          | .5        | .5                | .5        | 2            | 215  | 20                 | 15    |

1/ Rosemont, Morris, Crookston and Waseca stations.

Minnesota Composite Plots 1/

|              |      |       |      |      |    |      |      |      |     |     |     |     |      |     |    |    |
|--------------|------|-------|------|------|----|------|------|------|-----|-----|-----|-----|------|-----|----|----|
| 1764 x Henry | 2211 | 12773 | 32.0 | 57.0 | 30 | 12.9 | 12.4 | 72.7 | .55 | .63 | 2.0 | 2.0 | 1    | 892 | 75 | 85 |
| Thatcher     |      | 10003 | 24.4 | 56.3 | 24 | 12.6 | 11.8 | 71.4 | .53 | .61 | 2.5 | 2.5 | 1    | 804 | 85 | 85 |
| Mida         |      | 12008 | 28.0 | 59.8 | 29 | 12.0 | 11.5 | 74.5 | .51 | .62 | 2.0 | 2.0 | 1    | 722 | 85 | 80 |
| Average      |      |       | 28.1 | 57.7 | 28 | 12.5 | 11.9 | 72.9 | .53 | .62 | 2.2 | 2.2 | 1.00 | 806 | 82 | 83 |
| Range        |      |       | 7.6  | 3.5  | 6  | .9   | .9   | 3.1  | .04 | .2  | .5  | .5  | 0    | 170 | 10 | 5  |

1/ Morris and Crookston stations.

Minnesota Composite Plots 1/

|        |  |       |      |      |    |      |      |      |     |     |     |     |   |     |    |    |
|--------|--|-------|------|------|----|------|------|------|-----|-----|-----|-----|---|-----|----|----|
| Redman |  | 12496 | 27.1 | 56.4 | 29 | 13.0 | 12.3 | 72.5 | .50 | .62 | 2.5 | 2.5 | 1 | 845 | 85 | 85 |
|--------|--|-------|------|------|----|------|------|------|-----|-----|-----|-----|---|-----|----|----|

1/ Morris, Crookston and Rosemont stations.

Table 5.—Yield, milling, baking and chemical results for newer hard red spring wheats grown in single increase plots in 1950.

Langdon, North Dakota

| Variety or<br>Cross  | State or<br>N. No. | C. I.<br>No. | Acres | Yield:<br>Bu. | Weight:<br>Lbs. | Test:<br>Index | Pearl:<br>Value | Protein |      | Flour  |      | Absorp-<br>tion |      | Mixing:<br>Time |     | Optimum Baking Methods |        |         |
|----------------------|--------------------|--------------|-------|---------------|-----------------|----------------|-----------------|---------|------|--------|------|-----------------|------|-----------------|-----|------------------------|--------|---------|
|                      |                    |              |       |               |                 |                |                 | Wheat:  | Pct. | Flour: | Pct. | Ash:            | Pct. | Min.            | Mg. | Volume:                | Color: | Texture |
| Henry x Cadet        | 2239               | 12279        | 20.1  | 58.2          | 30              | 13.9           | 13.4            | 75.0    | .48  | 67     | 2.5  | 2               | 948  | 75              | 85  |                        |        |         |
| 1898 x Lee           | 2292               | 12967        | 26.9  | 59.9          | 28              | 14.0           | 13.3            | 74.3    | .48  | 68     | 3.0  | 1               | 889  | 85              | 90  |                        |        |         |
| 1764 x Henry         | 2232               | 12637        | 12.2  | 56.2          | 25              | 13.0           | 12.5            | 73.8    | .52  | 66     | 3.0  | 1               | 883  | 70              | 85  |                        |        |         |
| Henry x Cadet        | 2233               | 12781        | 19.0  | 58.8          | 31              | 13.7           | 13.4            | 78.0    | .52  | 66     | 2.0  | 2               | 879  | 75              | 85  |                        |        |         |
| Thatcher             | Check              | 10003        | 13.8  | 58.0          | 22              | 12.5           | 11.8            | 75.3    | .49  | 64     | 2.5  | 1               | 845  | 75              | 85  |                        |        |         |
| 1750 x Timstein      | 2237               | 12734        | 18.5  | 59.1          | 30              | 13.2           | 12.8            | 74.4    | .49  | 64     | 2.0  | 1               | 833  | 85              | 90  |                        |        |         |
| 2109 x 1912          | 2299-              |              | 14.4  | 55.6          | 22              | 12.6           | 12.2            | 74.3    | .51  | 64     | 2.0  | 2               | 833  | 70              | 85  |                        |        |         |
| Lee x 1912-1898      | 2294               |              | 23.6  | 58.0          | 29              | 12.8           | 12.0            | 75.2    | .48  | 64     | 2.5  | 0               | 830  | 75              | 90  |                        |        |         |
| Lee x 1831           | 2295               |              | 19.4  | 58.2          | 28              | 12.9           | 12.2            | 75.9    | .52  | 67     | 2.0  | 2               | 795  | 85              | 85  |                        |        |         |
| Henry x 1907         | 2242               | 12777        | 14.6  | 59.6          | 25              | 12.0           | 11.6            | 74.4    | .53  | 65     | 2.0  | 2               | 787  | 65              | 80  |                        |        |         |
| Marquis              | Check              | 3641         | 9.0   | 55.2          | 21              | 11.7           | 11.2            | 70.5    | .57  | 65     | 2.5  | 1               | 775  | 70              | 85  |                        |        |         |
| 2035 x 2109          | 2298               | 12790        | 22.7  | 60.7          | 26              | 12.0           | 11.3            | 74.7    | .46  | 64     | 2.0  | 1               | 772  | 80              | 90  |                        |        |         |
| Henry x Cadet        | 2300               | 12966        | 21.1  | 56.6          | 25              | 12.2           | 11.5            | 71.8    | .54  | 67     | 2.5  | 1               | 767  | 75              | 80  |                        |        |         |
| Mida                 | Check              | 12008        | 15.3  | 57.4          | 22              | 12.1           | 11.3            | 73.4    | .49  | 65     | 2.5  | 1               | 761  | 80              | 85  |                        |        |         |
| Kwan Do-Pilot x 2041 | 2303               |              | 13.8  | 55.0          | 23              | 12.0           | 11.5            | 71.4    | .58  | 69     | 2.0  | 1               | 740  | 65              | 80  |                        |        |         |
| 2109-1912 x Lee      | 2293               |              | 21.4  | 60.5          | 24              | 12.6           | 12.1            | 76.2    | .55  | 67     | 2.0  | 1               | 735  | 60              | 75  |                        |        |         |
| Kwan Do-Pilot x 2041 | 2305               |              | 17.3  | 58.0          | 24              | 11.6           | 10.9            | 72.0    | .52  | 65     | 2.0  | 0               | 732  | 70              | 80  |                        |        |         |
| Kwan Do-Pilot x 2041 | 2304               |              | 10.3  | 56.2          | 21              | 11.4           | 10.9            | 71.3    | .52  | 64     | 2.5  | 1               | 729  | 65              | 85  |                        |        |         |
| 1912 x 1919          | 2302               |              | 17.3  | 58.2          | 26              | 12.6           | 12.5            | 75.9    | .61  | 68     | 1.5  | 1               | 723  | 60              | 75  |                        |        |         |
| 1764 x Timstein      | 2301               |              | 11.2  | 51.1          | 20              | 12.4           | 11.9            | 70.6    | .70  | 73     | 3.5  | 2               | 701  | 50              | 60  |                        |        |         |
| Average              |                    |              | 17.1  | 57.5          | 26              | 12.6           | 12.0            | 73.9    | .53  | 66     | 2.3  | 1.20            | 783  | 72              | 83  |                        |        |         |
| Range                |                    |              | 17.9  | 9.6           | 11              | 2.6            | 2.5             | 7.5     | .24  | 9      | 1.5  | 2               | 247  | 35              | 15  |                        |        |         |



### UNIFORM REGIONAL NURSERY

Twenty-six wheats from the Uniform Regional Nursery have been tested in duplicate for their milling, baking, and chemical properties. An Eastern composite was composed of grain from eight stations and grain from eight dry-land stations made up the Western composite. Grain from the irrigated stations was not included or tested.

The results of the quality tests for the Eastern and Western composites and the average of both are shown in table 6. The discussion which follows is based on the average of the Eastern and Western composites.

Acres yields ranged from 20.6 bushels for Marquis to 32.2 bushels for Henry x Cadet, N. No. 2239.

The test-weight-per-bushel of the samples averaged 1.4 pounds higher than last year. There were only four samples that averaged lower than 57 pounds per bushel. These were Marquis, Thatcher, Redman, and 1764 x Henry, N. No. 2232. Redman was also one of the lower test-weight-per-bushel samples in the last two years' nursery trials. Henry x 1907 N. No. 2242, Thatcher x Surpresa II-39-7 and II-39-8, and Newthatch x Timstein-Premier II-43-19 were highest, averaging over 60 pounds per bushel. Thatcher x Surpresa II-39-8 also averaged the highest in test weight last year.

The protein content of the grain averaged 0.3 of a percent less than last year's nursery samples. Those varieties averaging between 15.0 and 15.8 percent were 1764 x Henry N. No. 2211, Henry x 1907 N. No. 2242, Henry x Cadet N. No. 2233, and N. No. 2239, Thatcher x Surpresa II-39-8, Timstein x Newthatch II-42-30, Thatcher x Surpresa II-39-7, Timstein x Newthatch II-42-37, Newthatch x Timstein-Premier II-43-19, Am<sup>10</sup> x Newthatch Ns 3684, Am<sup>10</sup> x Newthatch Ns 3679, and 1750 x Timstein N. No. 2237.

The flour yields for this year's nursery samples were very good. A number of strains produced a flour yield of 74 percent or better. Marquis averaged the lowest with a flour yield of 70.0 percent. Those samples yielding 74 percent or better were Thatcher, Henry x Cadet N. No. 2233, Thatcher x Surpresa II-39-8, Timstein x Newthatch II-42-37, Newthatch x Timstein-Premier II-43-19, and Ns 2744 x 2809 Ns 3274 and Ns 3291. Thatcher x Surpresa II-39-8, 2744 x 2809 Ns 3274 and 3291 were among the strains highest in flour yield in last year's tests.

The milling characteristics were satisfactory for most of the varieties and strains. A number of strains, however, showed hard milling characteristics. These were Pilot<sup>2</sup> x Merit N. No. 2174, Timstein x Newthatch II-42-37, Am<sup>10</sup> x Newthatch Ns 3684, Pilot x Merit N. No. 1996, and 1585 x Cadet N. No. 2118 rated as fair in milling. 1764 x Henry N. No. 2211 and N. No. 2118 were unsatisfactory in milling, being hard in texture and required more than the normal number of reductions to reduce the middlings to flour.

The flour ash content averaged slightly lower than last year. The lowest in ash content was Newthatch x Timstein-Premier II-43-19 (.41 percent) and the highest was Pilot<sup>2</sup> x Merit N. No. 2174, averaging .55 percent.

The bread-baking quality of this year's varieties and strains was slightly poorer than last year's samples. Most of the loaf volumes, however, were good considering the protein content of the varieties and strains. There were 11 varieties or strains with an optimum loaf volume of over 900 cc. The 3 varieties or strains having the highest optimum loaf volume were Henry x Cadet N. No. 2233, Thatcher x Surpresa II-39-7, and 1750 x Timstein N. No. 2237. Two of the strains or varieties lowest in loaf volume were 1552 x Mida N. No. 1924-44 and Marquis. Those having the best grain texture and crumb color were Redman, Timstein x Newthatch II-42-30, Newthatch x Timstein-Premier II-43-19, Ns 2744 x 2809 Ns 3274 and Ns 3291, Am<sup>10</sup> x Newthatch Ns 3679, and 1750 x Timstein N. No. 2237. The sample with the poorest grain texture and crumb color was 1585 x Cadet N. No. 2118.

The water absorption of the flour varied over a range of 5.0 percent with Pilot<sup>2</sup> x Merit N. No. 2174, and 1764 x Henry N. No. 2211 the highest. 1750 x Timstein N. No. 2313 and Thatcher x Surpresa II-39-8 were the lowest in water absorption.

The dough mixing times of this year's varieties and strains were similar to last year's samples. Thatcher and 1764 x Henry N. No. 2232 had the longest mixing time and those shortest were Thatcher x Surpresa II-39-8 and 1750 x Timstein N. No. 2237.

The responses to oxidizing agents (potassium bromate) for the 26 strains and varieties tested were about the same as last year's samples. Sixteen varieties or strains required the same amount of oxidizing agents, four samples slightly more, and six samples less than Thatcher. All were within the range generally considered satisfactory for hard red spring wheat.

Probably the most outstanding strains tested this year from the Uniform Regional Nursery are 1764 x Henry N. No. 2211, Henry x Cadet N. No. 2233, and N. No. 2239, Thatcher x Surpresa II-39-8, Timstein x Newthatch II-42-30 and II-42-37, Thatcher x Surpresa II-39-7, 1764 x Henry N. No. 2232, and 1750 x Timstein N. No. 2237. Other strains that are promising except for one or two deficiencies are Pilot x Merit N. No. 1996 because of low protein, and 1585 x Cadet N. No. 2118 which is low in protein and questionable in crumb color of bread.



Table 6.—Yield, milling, baking and chemical results on 26 wheats grown in the Uniform Regional Nursery for the Eastern Composite, Western Composite and the averages of the Eastern and Western Composites in 1950.

Eastern Composite 1/

| Variety or Cross     | State or N. No. | C. I. No. | Yield: Acre | Test: Weight | Pearl: Index | Wheat: Flour | Protein | Flour | Absorp.: time | Mixing: time | Promate: Volume | Optimum Baking Methods: Crumb: Color: Texture |
|----------------------|-----------------|-----------|-------------|--------------|--------------|--------------|---------|-------|---------------|--------------|-----------------|---|
|                      |                 |           |             |              |              |              |         |       |               |              |                 |   |
|                      |                 |           | Bu.         | Lbs.         | Pct.         | Pct.         | Pct.    | Pct.  | Pct.          | Min.         | Mg.             | Score   |
| Thatcher x Surpresa  | II-39-7         | 12782     | 29.5        | 62.9         | 30           | 14.8         | 14.1    | 71.2  | .42           | 60           | 1               | 936 75 90                                     |
| Henry x Cadet        | 2233            | 12781     | 29.9        | 59.4         | 29           | 14.5         | 13.9    | 74.8  | .48           | 63           | 1               | 928 75 85                                     |
| Timstein x Newthatch | II-42-37        | 12783     | 25.3        | 59.0         | 26           | 15.4         | 14.9    | 74.0  | .50           | 64           | 1               | 922 80 90                                     |
| Timstein x Newthatch | II-42-30        | 12739     | 27.4        | 58.5         | 31           | 14.5         | 13.8    | 71.2  | .47           | 60           | 1               | 912 85 90                                     |
| Henry x Cadet        | 2239            | 12779     | 30.4        | 59.4         | 29           | 14.7         | 13.8    | 72.7  | .49           | 62           | 1               | 910 75 90                                     |
| Thatcher x Surpresa  | II-39-8         | 12641     | 30.5        | 62.5         | 30           | 14.3         | 13.6    | 74.4  | .42           | 60           | 1               | 908 80 90                                     |
| 1750 x Timstein      | 2237            | 12734     | 28.0        | 60.1         | 32           | 14.6         | 13.7    | 71.6  | .46           | 62           | 1               | 905 90 90                                     |
| Newt. x Tim.-Premier | II-43-19        | 12784     | 31.5        | 63.8         | 30           | 14.6         | 13.9    | 74.5  | .40           | 60           | 1               | 871 85 85                                     |
| 1764 x Henry         | 2232            | 12637     | 28.7        | 57.6         | 25           | 13.6         | 13.1    | 70.4  | .47           | 64           | 1               | 865 80 90                                     |
| Thatcher             |                 | 10003     | 20.7        | 58.0         | 24           | 13.7         | 12.9    | 74.5  | .49           | 64           | 1               | 862 80 90                                     |
| 1764 x Henry         | 2211            | 12733     | 30.1        | 60.0         | 27           | 13.7         | 13.1    | 71.4  | .46           | 64           | 1               | 862 85 95                                     |
| Redman               | RL 1834.7       | 12638     | 24.5        | 57.0         | 28           | 13.7         | 13.1    | 72.6  | .49           | 63           | 1               | 853 90 90                                     |
| Pilot2 x Merit       | 2174            | 12732     | 25.1        | 58.6         | 21           | 13.3         | 12.5    | 73.5  | .56           | 64           | 1               | 847 80 90                                     |
| Am10 x Newthatch     | Ns. 3684        | 12742     | 28.6        | 58.5         | 27           | 14.7         | 14.1    | 71.7  | .47           | 64           | 1               | 847 95 90                                     |
| Am10 x Newthatch     | Ns. 3679        | 12786     | 23.4        | 58.6         | 28           | 15.0         | 14.8    | 73.3  | .45           | 63           | 1               | 839 85 85                                     |
| Am10 x Newthatch     | Ns. 3681        | 12787     | 28.2        | 59.2         | 25           | 13.7         | 13.0    | 72.3  | .47           | 63           | 1               | 839 80 90                                     |
| Thatcher x Apex      | Sask 2176       | 12639     | 20.7        | 59.5         | 25           | 13.7         | 12.8    | 72.7  | .50           | 62           | 1               | 821 75 85                                     |
| 2744 x 2809          | Ns. 3291        | 12741     | 24.7        | 60.0         | 27           | 13.4         | 12.5    | 74.6  | .46           | 60           | 1               | 818 85 90                                     |
| Henry x 1907         | 2242            | 12777     | 25.7        | 61.2         | 29           | 13.9         | 13.4    | 73.2  | .49           | 60           | 1               | 815 85 90                                     |
| 1750 x Timstein      | 2313            | 12778     | 28.4        | 59.6         | 31           | 13.5         | 12.8    | 72.2  | .43           | 60           | 0               | 812 90 95                                     |
| 2744 x 2809          | Ns. 3274        | 12643     | 25.6        | 60.2         | 28           | 13.6         | 12.8    | 74.4  | .44           | 62           | 1               | 812 80 90                                     |
| Pilot x Merit        | 1996            | 12648     | 23.3        | 58.8         | 22           | 12.8         | 11.9    | 72.0  | .50           | 60           | 1               | 812 75 90                                     |
| 1556 x Mida          | 2223            | 12785     | 24.0        | 58.6         | 26           | 13.2         | 12.2    | 72.8  | .51           | 60           | 1               | 801 75 90                                     |
| 1585 x Cadet         | 2118            | 12788     | 21.2        | 57.8         | 24           | 12.6         | 11.7    | 71.0  | .50           | 62           | 1               | 789 65 85                                     |
| Marquis              |                 | 3641      | 15.9        | 55.0         | 24           | 12.7         | 12.0    | 66.6  | .48           | 60           | 0               | 755 75 80                                     |
| 1552 x Mida          | 1924-44         | 12746     | 24.2        | 59.3         | 24           | 12.0         | 11.1    | 73.9  | .52           | 60           | 0               | 726 75 80                                     |
| Average              |                 |           | 26.0        | 59.4         | 27           | 13.9         | 13.1    | 72.6  | .47           | 62           | .88             | 849 81 89                                     |
| Range                |                 |           | 15.6        | 8.8          | 11           | 3.4          | 3.8     | 8.2   | .16           | 4            | 1.5             | 210 20 15                                     |

1/ Average of 8 eastern stations - Madison, St. Paul, Waseca, Morris, Crookston, Fargo, Langdon and Brookings.

## Western Composite 2/

- 19 -

| Variety or<br>Cross  | State or<br>N. No. | C. I.<br>No. | Acres | Yield:<br>Bu. | Test<br>Wt. Lbs. | Pearl-<br>Index | Protein        |       | Flour |      | Absorp-<br>tion | Mixing:<br>Time | Optimum Baking Methods |      |                |                 |
|----------------------|--------------------|--------------|-------|---------------|------------------|-----------------|----------------|-------|-------|------|-----------------|-----------------|------------------------|------|----------------|-----------------|
|                      |                    |              |       |               |                  |                 | Wheat<br>Flour | Yield | Yield | Pct. |                 |                 | Pct.                   | Mg.  | Loaf<br>Volume | Crumb:<br>Color |
| 1764 x Henry         | 2232               | 12637        | 30.4  | 57.1          | 29               | 15.6            | 15.6           | 70.7  | .52   | .52  | 66              | 3.0             | 1                      | 1039 | 80             | 85              |
| 1764 x Henry         | 2211               | 12733        | 30.4  | 58.3          | 28               | 16.2            | 16.0           | 72.2  | .50   | .50  | 68              | 2.5             | 1                      | 1033 | 75             | 85              |
| 1750 x Timstein      | 2237               | 12734        | 27.8  | 59.4          | 33               | 16.6            | 16.5           | 73.6  | .51   | .51  | 64              | 1.5             | 1                      | 1027 | 85             | 85              |
| Thatcher x Surpresa  | II-39-7            | 12782        | 31.3  | 62.2          | 32               | 16.2            | 16.1           | 76.2  | .45   | .45  | 63              | 1.5             | 2                      | 1024 | 80             | 85              |
| Henry x Cadet        | 2233               | 12781        | 30.1  | 57.8          | 32               | 16.0            | 15.7           | 73.1  | .50   | .50  | 65              | 2.0             | 1                      | 1009 | 75             | 85              |
| Pilot x Merit        | 1996               | 12648        | 30.0  | 60.0          | 28               | 15.0            | 14.7           | 74.6  | .44   | .44  | 65              | 2.5             | 1                      | 1001 | 90             | 85              |
| Timstein x Newthatch | II-42-30           | 12739        | 33.5  | 59.0          | 32               | 15.7            | 15.3           | 73.4  | .48   | .48  | 63              | 1.5             | 0                      | 992  | 95             | 90              |
| Timstein x Newthatch | II-42-37           | 12783        | 29.8  | 58.0          | 29               | 16.2            | 16.0           | 74.5  | .52   | .52  | 66              | 2.5             | 1                      | 963  | 85             | 85              |
| Thatcher             |                    | 10003        | 28.7  | 57.4          | 26               | 15.7            | 15.4           | 73.5  | .48   | .48  | 65              | 3.0             | 1                      | 962  | 80             | 90              |
| Henry x Cadet        | 2239               | 12779        | 34.0  | 58.5          | 30               | 15.9            | 15.5           | 73.3  | .52   | .52  | 64              | 2.5             | 2                      | 959  | 70             | 90              |
| Thatcher x Surpresa  | II-39-8            | 12641        | 30.9  | 61.5          | 33               | 16.0            | 15.6           | 75.2  | .44   | .44  | 62              | 1.5             | 2                      | 945  | 75             | 80              |
| Pilot2 x Merit       | 2174               | 12732        | 28.2  | 58.3          | 23               | 15.5            | 14.8           | 71.4  | .53   | .53  | 68              | 3.0             | 0                      | 939  | 85             | 90              |
| 1556 x Mida          | 2223               | 12785        | 27.6  | 57.7          | 31               | 15.9            | 15.2           | 74.1  | .52   | .52  | 64              | 2.0             | 1                      | 939  | 90             | 90              |
| 2744 x 2809          | Ns. 3291           | 12741        | 27.1  | 59.3          | 31               | 15.6            | 15.3           | 74.4  | .50   | .50  | 66              | 2.5             | 2                      | 934  | 90             | 90              |
| 1585 x Cadet         | 2118               | 12788        | 26.9  | 59.3          | 28               | 14.5            | 14.0           | 72.9  | .47   | .47  | 63              | 2.0             | 1                      | 928  | 75             | 80              |
| 1750 x Timstein      | 2313               | 12778        | 29.6  | 59.3          | 34               | 15.5            | 15.1           | 74.0  | .44   | .44  | 62              | 2.0             | 1                      | 920  | 75             | 85              |
| Marquis              |                    | 3641         | 25.3  | 58.7          | 28               | 15.7            | 15.1           | 73.4  | .55   | .55  | 64              | 2.5             | 1                      | 919  | 80             | 85              |
| 1552 x Mida          | 1924-44            | 12746        | 30.3  | 59.6          | 29               | 15.1            | 14.4           | 72.2  | .46   | .46  | 65              | 2.5             | 1                      | 918  | 50             | 90              |
| Am10 x Newthatch     | Ns. 3681           | 12787        | 33.3  | 58.8          | 29               | 15.4            | 15.0           | 73.4  | .51   | .51  | 65              | 2.5             | 1                      | 916  | 80             | 85              |
| Redman               |                    | 12638        | 26.9  | 57.0          | 30               | 15.0            | 14.7           | 74.6  | .48   | .48  | 65              | 2.5             | 1                      | 912  | 85             | 90              |
| Henry x 1907         | 2242               | 12777        | 28.3  | 60.0          | 31               | 16.4            | 15.7           | 72.6  | .47   | .47  | 64              | 2.0             | 1                      | 909  | 80             | 85              |
| 2744 x 2809          | Ns. 3274           | 12643        | 25.9  | 59.3          | 30               | 15.7            | 15.3           | 75.4  | .54   | .54  | 65              | 2.0             | 1                      | 899  | 90             | 90              |
| Newt. x Tim.-Premier | II-43-19           | 12784        | 32.0  | 63.2          | 31               | 16.0            | 15.5           | 75.3  | .41   | .41  | 65              | 2.0             | 1                      | 893  | 85             | 90              |
| Thatcher x Apex      | Sask 2176          | 12639        | 27.2  | 58.9          | 26               | 15.4            | 14.7           | 72.1  | .48   | .48  | 65              | 3.0             | 0                      | 892  | 75             | 90              |
| Am10 x Newthatch     | Ns. 3684           | 12742        | 29.5  | 57.8          | 29               | 15.7            | 15.4           | 73.1  | .56   | .56  | 65              | 2.0             | 1                      | 853  | 80             | 80              |
| Am10 x Newthatch     | Ns. 3679           | 12786        | 28.0  | 59.3          | 31               | 16.2            | 16.1           | 72.7  | .50   | .50  | 65              | 2.0             | 1                      | 853  | 90             | 90              |
| Average              |                    |              | 29.3  | 59.1          | 30               | 15.7            | 15.3           | 73.5  | .49   | .49  | 65              | 2.3             | 1.04                   | 945  | 82             | 87              |
| Range                |                    |              | 8.7   | 6.2           | 10               | 2.1             | 2.5            | 5.5   | .15   | .15  | 6               | 1.5             | 2                      | 186  | 25             | 10              |

2/ Average of 8 western stations - Dickinson, Minot, Moccasin, Havre, Akron, Ft. Collins, Laramie and Bozeman.



Table 6.—Continued.

Average of Eastern and Western Composites

| Variety or Cross     | State or N. No. | C. I. No. | Yield | Acres | Test Weight | Index | Pearl Value | Protein |      | Flour |      | Absorption | Mixing |     | Optimum Baking Methods |       |       |
|----------------------|-----------------|-----------|-------|-------|-------------|-------|-------------|---------|------|-------|------|------------|--------|-----|------------------------|-------|-------|
|                      |                 |           |       |       |             |       |             | Pct.    | Pct. | Pct.  | Pct. |            | Min.   | Mg. | Oc                     | Score | Score |
| Thatcher x Surpresa  | II-39-7         | 12782     | 30.4  | 62.6  | 31          | 15.5  | 15.1        | 73.7    | .44  | 62    | 1.8  | 1.5        | 980    | 78  | 88                     |       |       |
| Henry x Cadet        | 2237            | 12781     | 30.0  | 58.6  | 31          | 15.3  | 14.8        | 74.0    | .49  | 64    | 2.3  | 1.0        | 969    | 75  | 85                     |       |       |
| 1750 x Timstein      | 2237            | 12734     | 27.9  | 59.8  | 33          | 15.6  | 15.1        | 72.6    | .49  | 63    | 1.5  | 1.0        | 966    | 88  | 88                     |       |       |
| 1764 x Henry         | 2232            | 12637     | 29.6  | 57.4  | 27          | 14.6  | 14.4        | 70.6    | .50  | 65    | 3.0  | 1.0        | 952    | 80  | 88                     |       |       |
| Timstein x Newthatch | II-42-30        | 12739     | 30.5  | 58.8  | 32          | 15.1  | 14.6        | 73.3    | .48  | 62    | 1.8  | .5         | 952    | 90  | 90                     |       |       |
| 1764 x Henry         | 2211            | 12733     | 30.3  | 59.2  | 28          | 15.0  | 14.6        | 71.8    | .48  | 66    | 2.5  | 1.0        | 948    | 80  | 90                     |       |       |
| Timstein x Newthatch | II-42-37        | 12783     | 27.6  | 58.5  | 28          | 15.8  | 15.5        | 74.3    | .51  | 65    | 2.8  | 1.0        | 943    | 83  | 88                     |       |       |
| Henry x Cadet        | 2239            | 12779     | 32.2  | 59.0  | 30          | 15.3  | 14.7        | 73.0    | .43  | 61    | 1.5  | 1.5        | 935    | 73  | 90                     |       |       |
| Thatcher x Surpresa  | II-39-8         | 12641     | 30.7  | 62.0  | 32          | 15.2  | 14.6        | 74.8    | .49  | 65    | 3.0  | 1.0        | 912    | 80  | 90                     |       |       |
| Thatcher             | 10003           | 24.7      | 57.7  | 25    | 14.7        | 14.2  | 74.0        | .49     | 65   | 3.0   | 2.8  | 1.0        | 907    | 83  | 88                     |       |       |
| Pilot x Merit        | 1996            | 12648     | 26.7  | 59.4  | 25          | 13.9  | 13.3        | 73.3    | .47  | 63    | 2.8  | 1.0        | 893    | 83  | 90                     |       |       |
| Pilot2 x Merit       | 2174            | 12732     | 26.7  | 58.5  | 22          | 14.4  | 13.7        | 72.5    | .55  | 66    | 2.8  | .5         | 883    | 88  | 90                     |       |       |
| Redman               | RL 1834.7       | 12638     | 25.7  | 57.0  | 29          | 14.4  | 13.9        | 73.6    | .49  | 64    | 2.8  | 1.0        | 882    | 85  | 88                     |       |       |
| Neyt. x Tim.-Premier | II-43-19        | 12784     | 31.8  | 63.5  | 31          | 15.3  | 14.7        | 74.9    | .41  | 63    | 2.0  | 1.0        | 878    | 80  | 88                     |       |       |
| Amlo x Newthatch     | Ns 3681         | 12787     | 30.8  | 59.0  | 27          | 14.6  | 14.0        | 72.9    | .49  | 64    | 2.5  | 1.0        | 876    | 88  | 90                     |       |       |
| 2744 x 2809          | Ns 3291         | 12741     | 25.9  | 59.7  | 29          | 14.5  | 13.9        | 74.5    | .48  | 63    | 2.5  | 1.5        | 870    | 83  | 90                     |       |       |
| 1556 x Mida          | 2223            | 12785     | 25.8  | 58.2  | 29          | 14.6  | 13.7        | 73.5    | .52  | 62    | 2.0  | 1.0        | 866    | 83  | 90                     |       |       |
| 1750 x Timstein      | 2313            | 12778     | 29.0  | 59.5  | 33          | 14.5  | 14.0        | 73.1    | .44  | 61    | 2.0  | .5         | 862    | 83  | 88                     |       |       |
| Henry x 1907         | 2242            | 12777     | 27.0  | 60.6  | 30          | 15.2  | 14.6        | 72.9    | .48  | 62    | 2.0  | 1.0        | 859    | 70  | 83                     |       |       |
| 1585 x Cadet         | 2118            | 12788     | 24.1  | 58.6  | 26          | 13.6  | 12.9        | 72.0    | .49  | 63    | 2.3  | 1.0        | 857    | 75  | 88                     |       |       |
| Thatcher x Apex      | Sask 2176       | 12639     | 24.0  | 59.2  | 26          | 14.6  | 13.8        | 72.4    | .49  | 64    | 2.8  | .5         | 856    | 85  | 90                     |       |       |
| 2744 x 2809          | Ns 3274         | 12643     | 25.8  | 59.8  | 29          | 14.7  | 14.1        | 74.9    | .49  | 64    | 2.0  | 1.0        | 850    | 88  | 85                     |       |       |
| Amlo x Newthatch     | Ns 3684         | 12742     | 29.1  | 58.2  | 28          | 15.2  | 14.8        | 72.4    | .52  | 65    | 2.0  | 1.0        | 846    | 88  | 88                     |       |       |
| Amlo x Newthatch     | Ns 3679         | 12786     | 25.7  | 59.0  | 30          | 15.6  | 15.5        | 73.0    | .48  | 64    | 2.3  | 1.0        | 837    | 78  | 83                     |       |       |
| Marquis              | 3641            | 20.6      | 56.9  | 26    | 14.2        | 13.6  | 70.0        | .52     | 62   | 2.8   | 2.8  | .5         | 822    | 83  | 85                     |       |       |
| 1552 x Mida          | 1924-44         | 12746     | 27.3  | 59.5  | 27          | 13.6  | 12.8        | 73.1    | .49  | 63    | 2.8  | .5         | 822    | 83  | 85                     |       |       |
| Average              |                 | 27.7      | 59.2  | 29    | 14.8        | 14.3  | 73.1        | .49     | 63   | 2.4   | .96  | 897        | 82     | 88  |                        |       |       |
| Range                |                 | 11.6      | 6.6   | 11    | 2.2         | 2.7   | 4.9         | .12     | 5    | 1.5   | 1.0  | 158        | 20     | 7   |                        |       |       |

INTRASTATE NURSERY COMPOSITES

Results from composite samples of the North Dakota Intrastate Nursery grown at Fargo, Langdon, and Dickinson, and for the Montana Intrastate Nursery grown at Moccasin are given in table 7.

Results for composites for a nursery grown at Fargo, Langdon, Mandan, and Dickinson are given in table 8 along with data on nursery samples from Dickinson, North Dakota, and Brookings, South Dakota.



Table 7.—Yield, milling, baking, and chemical results on hard red spring wheats grown in Intrastate Nurseries composited from stations indicated, 1950 crop.

North Dakota Intrastate Nursery 1/

| Variety or Cross        | State or N. No. | C. I. No. | Acres | Yield: Bu. | Test Weight: Lbs. | Pearl: Pct. | Wheat: Pct. | Flour: Pct. | Absorp- tion: Pct. | Mixing: Time: Min. | Optimum Baking Methods: Promate: Volume: Mg. | Crumb: Color: Score | Grain: Texture: Score |
|-------------------------|-----------------|-----------|-------|------------|-------------------|-------------|-------------|-------------|--------------------|--------------------|--|---------------------|-----------------------|
|                         |                 |           |       |            |                   |             |             |             |                    |                    |  |                     |                       |
| 5.2.40 Thatcher         | 3764            |           |       | 28.0       | 61.0              | 30          | 14.3        | 14.0        | 75.4               | .47                | 67   | 934                 | 80 85                 |
| Henry x Cadet           | 2300            | 10003     |       | 25.8       | 59.7              | 26          | 14.7        | 13.9        | 74.2               | .42                | 65   | 925                 | 75 85                 |
| Pilot x Newthatch       | 2144            | 12966     |       | 33.9       | 60.0              | 27          | 14.4        | 13.9        | 75.1               | .47                | 67   | 919                 | 75 80                 |
| Regent-Mida x 1552-Mida | 2286            |           |       | 26.7       | 58.4              | 27          | 14.7        | 13.9        | 74.2               | .43                | 63   | 916                 | 90 85                 |
| 1764 x Henry            | 2319            |           |       | 30.2       | 59.2              | 27          | 14.1        | 13.4        | 75.0               | .42                | 64   | 916                 | 80 85                 |
| Regent-Mida x 1552-Mida | 2345            |           |       | 31.1       | 59.7              | 27          | 14.5        | 14.2        | 75.9               | .49                | 65   | 913                 | 85 90                 |
| Lee x 3175              | 3654            |           |       | 27.4       | 58.8              | 25          | 13.9        | 13.2        | 75.2               | .48                | 65   | 903                 | 85 85                 |
| 1.13.22                 | 3704            | 12907     |       | 31.9       | 60.7              | 27          | 14.5        | 13.9        | 75.7               | .43                | 66   | 894                 | 85 90                 |
| 1750 x 1752             | 2218            |           |       | 26.5       | 58.0              | 24          | 14.7        | 14.1        | 74.3               | .49                | 66   | 885                 | 90 90                 |
| Regent-Mida x 1552-Mida | 2308            |           |       | 30.6       | 61.7              | 27          | 14.1        | 13.3        | 74.5               | .41                | 65   | 882                 | 85 90                 |
| 1.13.21                 | 3751            |           |       | 26.6       | 60.5              | 26          | 13.8        | 13.0        | 75.7               | .46                | 65   | 882                 | 90 90                 |
| 9.2.4                   | 3768            |           |       | 32.3       | 58.6              | 29          | 14.7        | 14.2        | 74.2               | .49                | 65   | 881                 | 80 90                 |
| Regent-Mida x 1552-Mida | 2346            |           |       | 30.1       | 59.0              | 29          | 14.4        | 14.1        | 75.3               | .49                | 65   | 879                 | 80 90                 |
| 1.13.6                  | 3993            |           |       | 25.2       | 58.5              | 28          | 14.3        | 13.4        | 75.4               | .42                | 61   | 879                 | 100 90                |
| 1764 x Timstein         | 2236            |           |       | 30.0       | 58.1              | 26          | 14.4        | 14.1        | 75.2               | .48                | 66   | 856                 | 85 90                 |
| 9.25.3                  | 3793            |           |       | 24.5       | 57.8              | 30          | 15.1        | 14.8        | 74.9               | .51                | 65   | 853                 | 90 90                 |
| Henry x 1907            | 2320            |           |       | 30.4       | 59.5              | 26          | 14.9        | 14.0        | 73.6               | .42                | 65   | 848                 | 90 95                 |
| 1898 x Lee              | 2292            |           |       | 31.4       | 59.2              | 26          | 13.6        | 13.0        | 75.1               | .43                | 65   | 847                 | 80 85                 |
| 3.6.7                   | 3714            | 12967     |       | 30.7       | 61.6              | 28          | 15.1        | 14.2        | 75.1               | .44                | 68   | 845                 | 90 80                 |
| 2109-1912 x Lee         | 2293            |           |       | 32.8       | 58.0              | 24          | 14.9        | 14.2        | 74.8               | .46                | 65   | 842                 | 75 95                 |
| Kwan Do-Pilot x 2041    | 2304            |           |       | 28.0       | 59.6              | 27          | 13.4        | 12.5        | 73.8               | .51                | 63   | 839                 | 85 90                 |
| 1.10.52                 | 3699            |           |       | 29.9       | 60.6              | 25          | 13.9        | 13.3        | 75.4               | .46                | 65   | 839                 | 70 85                 |
| Lee x 1831              | 2295            |           |       | 29.9       | 58.6              | 25          | 14.7        | 13.9        | 74.8               | .48                | 67   | 836                 | 85 95                 |
| 1.2.13                  | 3792            |           |       | 27.7       | 60.4              | 26          | 14.2        | 13.6        | 75.7               | .46                | 65   | 833                 | 90 95                 |
| 1590 x Thatcher         | 1956            |           |       | 27.4       | 58.1              | 28          | 15.4        | 15.1        | 74.6               | .50                | 65   | 815                 | 80 85                 |
|                         |                 | 12630     |       | 27.1       | 59.1              | 30          | 13.3        | 12.8        | 76.5               | .52                | 65   | 801                 | 85 90                 |
| Average                 |                 |           |       | 29.1       | 59.4              | 27          | 14.4        | 13.8        | 75.0               | .46                | 65   | 1.19                | 84 88                 |
| Range                   |                 |           |       | 9.4        | 3.9               | 6           | 2.1         | 2.3         | 2.9                | .11                | 7  | 2                   | 133 25 15             |

1/ Fargo, Langdon, and Dickinson.







Table 8.—Continued.

## Dickinson, North Dakota (Station Nursery)

| Variety or<br>Cross        | State or<br>N. No. | C. I.<br>No. | Acre<br>: No. | Yield<br>: No. | Test<br>: Weight | Pearl-<br>: Index | Bu.<br>Lbs. | Wheat |      | Flour |      | Absorp-<br>: tion | Mixing<br>: Time | Optimum Baking Methods |       |         |    |
|----------------------------|--------------------|--------------|---------------|----------------|------------------|-------------------|-------------|-------|------|-------|------|-------------------|------------------|------------------------|-------|---------|----|
|                            |                    |              |               |                |                  |                   |             | Pct.  | Pct. | Pct.  | Pct. |                   |                  | Bromate<br>: Volume    | Color | Texture |    |
| 1552 x Pilot               | 40.5A1-1-5-1-1     |              |               |                | 57.1             | 31                |             | 16.0  | 15.4 | 71.6  | .43  | 65                | 1.5              | 2                      | 1110  | 80      | 80 |
| 1552 x Pilot               | 40.5A1-1-5-4       |              |               |                | 57.7             | 30                |             | 16.1  | 15.5 | 71.8  | .46  | 69                | 1.5              | 2                      | 1044  | 80      | 85 |
| 1556 x Pilot               | 2307               |              |               |                | 57.4             | 28                |             | 15.9  | 15.5 | 71.4  | .44  | 62                | 2.0              | 2                      | 980   | 85      | 85 |
| Regent-Mida x 1552-Mida    | 2346               |              |               |                | 60.1             | 32                |             | 15.7  | 15.3 | 74.5  | .48  | 67                | 2.0              | 2                      | 974   | 85      | 85 |
| 1556 x 1563                | 39.9B1-15-1        |              |               |                | 58.9             | 28                |             | 15.3  | 14.7 | 72.4  | .42  | 67                | 1.5              | 2                      | 971   | 80      | 90 |
| Regent-Mida x 1552-Mida    | 2345               |              |               |                | 60.2             | 29                |             | 15.0  | 14.5 | 74.8  | .46  | 67                | 2.0              | 2                      | 959   | 80      | 85 |
| Regent x Mida <sup>2</sup> | 2347               |              |               |                | 59.0             | 30                |             | 14.4  | 14.0 | 75.1  | .49  | 65                | 2.0              | 2                      | 956   | 85      | 90 |
| Pilot x Newthatch          | 41.25A1-8-4-5      |              |               |                | 56.3             | 24                |             | 15.0  | 14.4 | 71.1  | .44  | 62                | 2.0              | 1                      | 951   | 80      | 90 |
| 1563 x Regent              | 42.25A1-10-1-5     |              |               |                | 58.3             | 26                |             | 15.0  | 14.6 | 74.4  | .41  | 60                | 2.0              | 3                      | 943   | 85      | 85 |
| Thatcher                   | 10003              |              |               |                | 58.2             | 25                |             | 15.8  | 15.1 | 72.3  | .41  | 64                | 2.0              | 2                      | 940   | 75      | 95 |
| 1556 x Pilot               | 41.11A2-29-5       |              |               |                | 60.0             | 27                |             | 15.2  | 14.5 | 73.0  | .39  | 63                | 2.0              | 1                      | 937   | 95      | 85 |
| Regent x Mida              | 1844-15            |              |               |                | 59.3             | 28                |             | 14.5  | 13.9 | 74.6  | .45  | 63                | 2.0              | 1                      | 928   | 85      | 85 |
| Regent x Mida              | 1844-94            |              |               |                | 60.0             | 24                |             | 14.6  | 14.2 | 74.3  | .49  | 64                | 2.5              | 0                      | 925   | 95      | 85 |
| Regent x Mida <sup>2</sup> | 43.9A1-4-4-2       |              |               |                | 58.2             | 25                |             | 15.2  | 14.4 | 72.3  | .45  | 64                | 2.0              | 2                      | 916   | 90      | 90 |
| Regent x Mida              | 39.21B1-17-2-2     |              |               |                | 60.4             | 31                |             | 14.6  | 13.9 | 74.7  | .48  | 64                | 2.0              | 2                      | 910   | 85      | 85 |
| 1740 x Mida                | 2306               |              |               |                | 60.4             | 27                |             | 15.0  | 14.4 | 73.9  | .40  | 62                | 1.5              | 1                      | 900   | 90      | 90 |
| Regent x Mida              | 1843-68            |              |               |                | 58.4             | 26                |             | 14.3  | 13.8 | 71.1  | .37  | 62                | 2.0              | 2                      | 853   | 80      | 80 |
| Average                    |                    |              |               |                | 58.8             | 28                |             | 15.2  | 14.6 | 73.1  | .44  | 64                | 1.9              | 1.71                   | 953   | 84      | 86 |
| Range                      |                    |              |               |                | 3.3              | 8                 |             | 1.8   | 1.7  | 4.0   | .12  | 9                 | 1.0              | 3.0                    | 210   | 20      | 15 |



Table 8.—Continued.

Brookings, South Dakota (Station Nursery)

| Variety or<br>Cross               | State or<br>N. No. | C. I. Acre<br>No. | Yield<br>Bu. | Lbs. | Pearl-<br>:Test : ing :<br>:Weight:Index<br>:Value : | Wheat :<br>:Flour :<br>:Yield :<br>:Ash : | Protein<br>Pct. | Flour<br>Pct. | Absorp-<br>:tion :<br>:Time : | Optimum Baking Methods<br>Bromate :<br>:Volume :<br>:Color :<br>:Texture : | Cc  | Score | Score |
|-----------------------------------|--------------------|-------------------|--------------|------|--|---|-----------------|---------------|-------------------------------|--|-----|-------|-------|
|                                   |                    |                   |              |      |  |   |                 |               |                               |  |     |       |       |
| Rushmore <sup>2</sup> x Surpresa  | 49-79              |                   | 25.6         | 62.1 | 32   | 15.5                                      | 15.2            | 77.1          | .50                           | 64   | 2.0 | 85    | 85    |
| 2109 x 1912                       | 2299               |                   | 22.9         | 60.0 | 29   | 13.4                                      | 13.1            | 74.3          | .49                           | 62   | 1.5 | 868   | 70    |
| Lee                               |                    | 12488             | 26.0         | 61.9 | 29   | 14.5                                      | 14.2            | 73.8          | .46                           | 66   | 2.5 | 859   | 90    |
| 2035 x 2109                       | 2298               |                   | 23.9         | 63.6 | 28   | 13.6                                      | 12.7            | 76.7          | .44                           | 65   | 2.5 | 839   | 90    |
| Rushmore <sup>2</sup> x Clarendon | 49-91              |                   | 23.3         | 60.5 | 32   | 13.7                                      | 13.3            | 75.2          | .45                           | 64   | 2.0 | 830   | 85    |
| Rushmore <sup>2</sup> x Clarendon | 49-109             |                   | 21.0         | 58.7 | 28   | 13.3                                      | 12.9            | 74.6          | .51                           | 64   | 2.0 | 830   | 70    |
| Pilot x Merit                     | 2012               |                   | 20.4         | 59.8 | 21   | 13.1                                      | 12.5            | 74.3          | .49                           | 70   | 3.0 | 812   | 75    |
| Lee x 1831                        | 2295               |                   | 20.8         | 60.0 | 29   | 13.6                                      | 13.0            | 76.5          | .51                           | 67   | 2.5 | 801   | 80    |
| 1898 x Merit                      | 2292               | 12967             | 24.7         | 62.2 | 27   | 14.5                                      | 13.8            | 75.2          | .44                           | 68   | 3.0 | 792   | 85    |
| Rushmore <sup>2</sup> x Surpresa  | 49-10              |                   | 26.7         | 64.6 | 29   | 14.6                                      | 13.5            | 75.8          | .40                           | 58   | 1.5 | 789   | 95    |
| Rushmore <sup>2</sup> x Surpresa  | 49-12              |                   | 27.2         | 64.3 | 29   | 14.2                                      | 13.4            | 78.4          | .44                           | 60   | 1.0 | 789   | 85    |
| Rushmore <sup>2</sup> x Surpresa  | 49-11              |                   | 28.5         | 63.9 | 28   | 14.4                                      | 13.6            | 76.1          | .42                           | 58   | 1.5 | 784   | 90    |
| Rushmore <sup>2</sup> x Surpresa  | 49-61              |                   | 23.2         | 62.7 | 29   | 14.3                                      | 13.5            | 74.9          | .44                           | 62   | 1.5 | 781   | 80    |
| 2109-1912 x Lee                   | 2293               |                   | 27.4         | 62.2 | 26   | 13.1                                      | 12.3            | 76.2          | .54                           | 66   | 1.5 | 766   | 90    |
| Kwan Do-Pilot x 2041              | 2304               |                   | 15.1         | 58.7 | 24   | 12.6                                      | 11.9            | 75.8          | .46                           | 64   | 3.0 | 749   | 60    |

Average

Range

23.9 61.7

13.6 5.9

28

11

13.9

2.9

13.3

3.3

75.7

4.6

.47

.14

64

12

2.1

2.0

2.07

2

811

121

82

35

90

15

COMMERCIAL SAMPLES

As in past years a number of commercially grown wheat samples were obtained through the Grain Branch, Production and Marketing Administration for comparison with the varieties and strains produced in experimental plots. Twenty such samples, representing a number of grades and types, were obtained at Denver, Colorado; Great Falls, Montana; and Minneapolis and Duluth, Minnesota. The samples were composited by grade from 3,553 cars of wheat grading No. 3 or better. This is the twelfth season such samples have been tested. The results are given in table 9.

These samples generally averaged lower in protein content than the experimental plot and nursery samples. Otherwise, the milling, baking, and chemical results do not appear to be greatly different, especially when compared with samples having approximately the same protein content and test-weight-per-bushel.





### CORRELATION AND REGRESSIONS

Correlation coefficients ( $r$ ) for optimum loaf volume and flour protein content of eight varieties and strains have been calculated and are presented in table 10. Also shown in this table is the slope of the regression line or the change in loaf volume for each 1.0 percent of protein ( $b_1$ ), the average protein content of the flour and the loaf volume of the bread, and the loaf volumes adjusted to a 13.0 percent protein basis by the means of the regression equation. The plotted regression lines for each variety are shown in two graphs in figure 1.

The graphs show that the relation between loaf volume and protein content is generally linear. These results are in accordance with those of the last six years (1944 to 1949) where, with a few exceptions, the points fell on or very close to the calculated regression lines. Most of the correlation coefficients for loaf volume and flour protein content are high. The highest coefficients are for Pilot and Lee. The wheat having the lowest coefficients this season was 1764 x Henry. It should be noted that the number of samples of each variety is rather small for a study of this kind. This fact should be considered in evaluating the results.

One of the important results of this study and of interest is the difference in the level and particularly in the slope of the regression lines for the different varieties. The regression lines for the eight wheats shown in the two graphs include the regression lines for Thatcher and Mida repeated in each graph as standards of comparison. There was some variation in the slope and level of the regression lines among the varieties compared in graph A. A comparison of the regression lines shows that 1764 x Henry is perhaps the best of the wheats in quality compared in this graph. The change in loaf volume for 1 percent of protein was highest for Pilot (54.7 cc.) and lowest for 1764 x Henry (36.2 cc.). The loaf volume converted to a 13.0 percent protein basis shows that Thatcher and Mida were lowest and 1764 x Henry highest of the group.

Cadet in graph B appears to be better in quality than the other varieties. Lee appears to be much like Mida, both lower than Thatcher. The loaf volume converted to a 13.0 percent protein basis shows that Thatcher is highest of the group and Mida lowest, with Cadet, Rushmore, and Lee falling in between.



Table 10.--Statistical summary of protein content-loaf volume data for varieties of hard red spring wheat.

| Variety<br>or<br>Cross | : State<br>: or<br>: N. No.: | : No. of<br>: samples: | : $b_1$ <u>1/</u> : | : $r$ <u>2/</u> : | : Protein<br>: of<br>: flour | : Average<br>; loaf<br>: Volume | : Loaf volume at<br>: 13.0 pct. pro-<br>: tein content <u>3/</u> |
|------------------------|------------------------------|------------------------|---------------------|-------------------|------------------------------|---------------------------------|--|
|                        |                              |                        |                     |                   | Percent                      | Cc                              |  |
| 1764 x Henry           | 2211                         | 11                     | 36.2                | .810              | 14.3                         | 919                             | 872  |
| Pilot                  |                              | 13                     | 54.7                | .954              | 13.8                         | 909                             | 866  |
| Rival                  |                              | 12                     | 51.5                | .876              | 12.3                         | 809                             | 845  |
| Thatcher               |                              | 25                     | 51.8                | .900              | 13.4                         | 858                             | 837  |
| Cadet                  |                              | 17                     | 43.7                | .912              | 13.4                         | 850                             | 833  |
| Rushmore               |                              | 11                     | 42.8                | .911              | 13.5                         | 839                             | 818  |
| Lee                    |                              | 17                     | 49.3                | .924              | 14.1                         | 855                             | 800  |
| Mida                   |                              | 20                     | 43.3                | .915              | 12.6                         | 781                             | 798  |

- 1/ Slope of the regression line or the cubic centimeter change in loaf volume for each 1 percent of protein.
- 2/ Correlation coefficients for loaf volume and flour protein content. All correlation coefficients are significant at the 1 percent level.
- 3/ Calculated from regression equation.

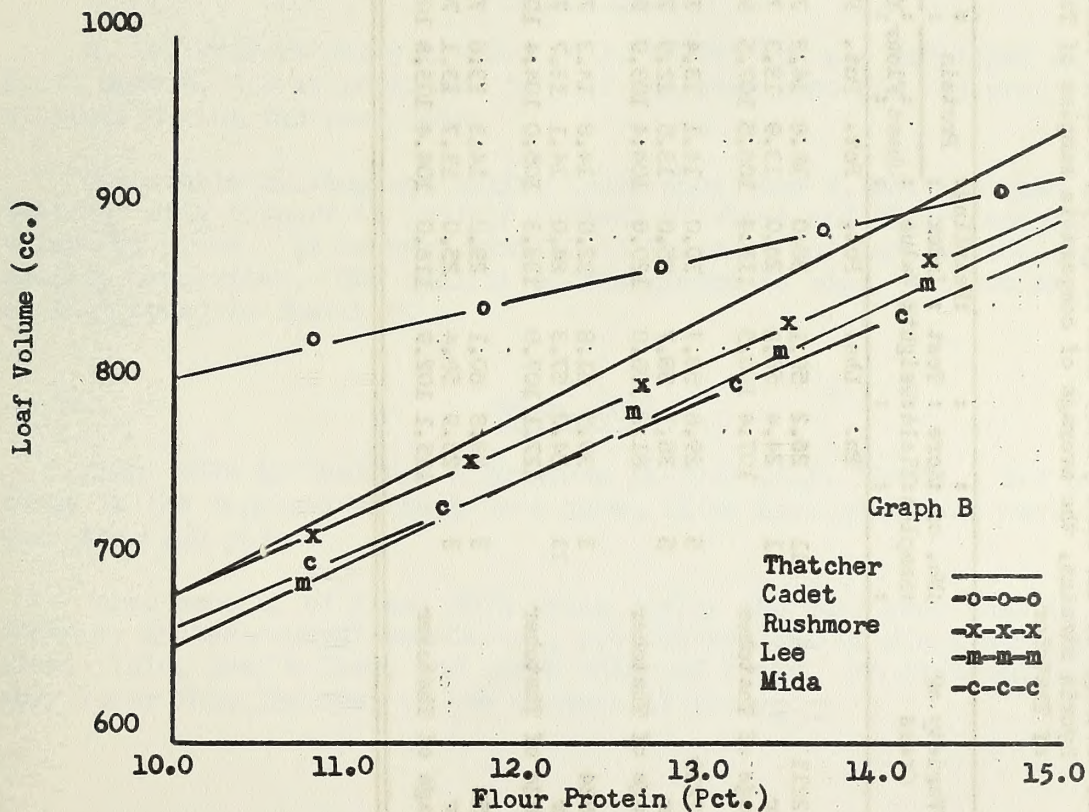
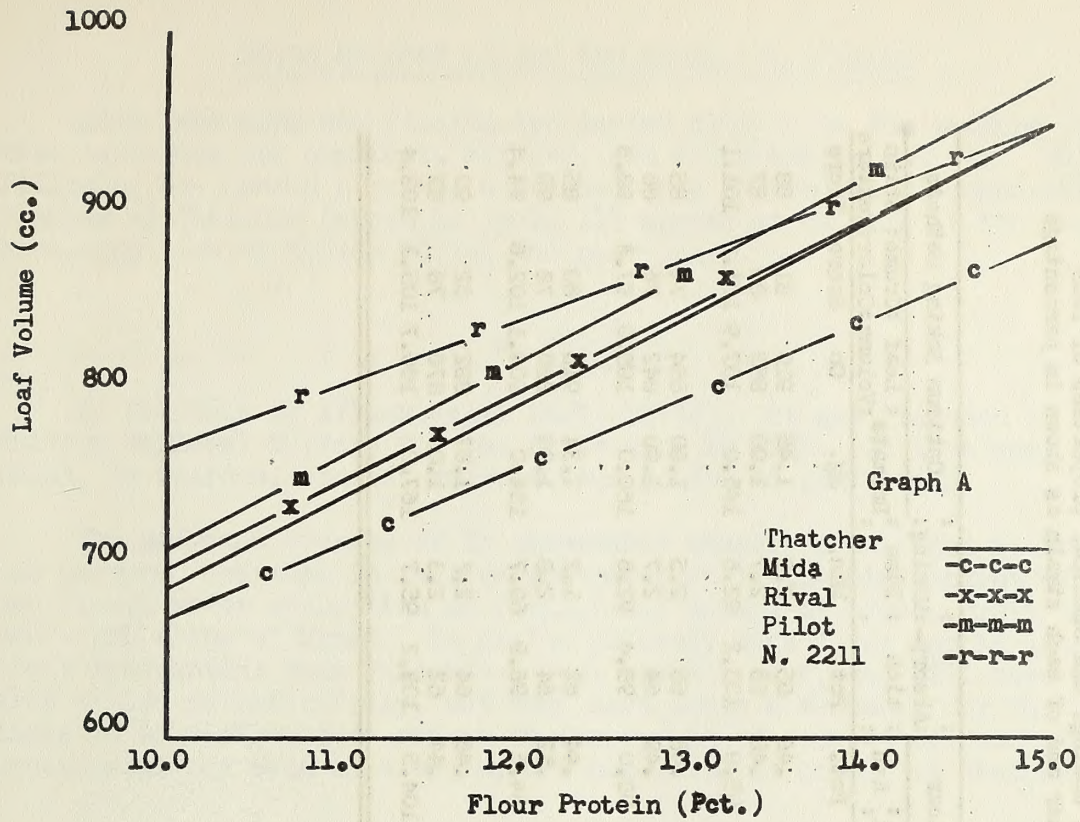


Fig. 1.-Regression lines for flour protein and loaf volume for a number of hard red spring varieties and strains with Thatcher and Mida included for comparisons, 1950 crop.



Table 11.---Average of the acre yield, test-weight-per bushel, milling, baking, and chemical properties of four hybrid strains, the average of comparable samples of Thatcher and of each strain as shown in percentage of Thatcher.

| Variety or Cross       | No. of Samples | Acre Yield | Test Weight | Pearling: |       | Protein |       | Flour |       | Absorp- tion |       | Mixing: Time |       | Optimum Baking Methods |             |               |
|------------------------|----------------|------------|-------------|-----------|-------|---------|-------|-------|-------|--------------|-------|--------------|-------|------------------------|-------------|---------------|
|                        |                |            |             | Pct.      | Pct.  | Pct.    | Pct.  | Pct.  | Pct.  | Pct.         | Pct.  | Min.         | Max.  | Bromate                | Loaf Volume | Crumb:Texture |
|                        |                | Bu.        | Lbs.        |           |       |         |       |       |       |              |       |              |       | Mg.                    | Oz          | Score         |
| N. No. 2211            | 11             | 26.2       | 59.1        | 30.0      | 14.8  | 14.3    | 72.2  | .46   | 65    | 2.5          | 1.45  | 919          | 81    | 88                     |             |               |
| Thatcher               | 11             | 24.4       | 58.8        | 26.0      | 13.9  | 13.3    | 73.5  | .48   | 63    | 2.7          | 1.00  | 852          | 80    | 87                     |             |               |
| Percentage of Thatcher |                | 107.4      | 100.5       | 115.4     | 106.5 | 107.5   | 98.2  | 95.8  | 103.2 | 92.6         | 145.0 | 107.9        | 101.3 | 101.1                  |             |               |
| N. No. 2239            | 5              | 29.8       | 58.7        | 30.0      | 14.1  | 13.4    | 73.3  | .48   | 63    | 2.5          | 1.60  | 884          | 74    | 85                     |             |               |
| Thatcher               | 5              | 36.7       | 58.7        | 25.0      | 13.5  | 12.9    | 73.9  | .49   | 64    | 2.7          | 1.00  | 842          | 76    | 86                     |             |               |
| Percentage of Thatcher |                | 81.2       | 100.0       | 120.0     | 104.4 | 103.9   | 99.2  | 98.0  | 98.4  | 92.6         | 160.0 | 105.0        | 97.4  | 98.8                   |             |               |
| Minn. 2824             | 3              | 30.5       | 61.8        | 32.0      | 14.8  | 14.3    | 74.8  | .44   | 62    | 1.7          | 1.34  | 916          | 80    | 85                     |             |               |
| Thatcher               | 33             | 24.0       | 57.3        | 24.0      | 14.1  | 13.7    | 73.6  | .52   | 64    | 2.8          | 1.00  | 880          | 78    | 90                     |             |               |
| Percentage of Thatcher |                | 127.1      | 107.9       | 133.3     | 105.0 | 104.4   | 101.6 | 84.6  | 96.9  | 60.7         | 134.0 | 104.1        | 102.6 | 94.4                   |             |               |
| N.D. 3654              | 3              | 29.8       | 60.1        | 29.0      | 14.3  | 13.6    | 75.4  | .46   | 64    | 2.2          | 1.67  | 882          | 82    | 90                     |             |               |
| Thatcher               | 3              | 25.9       | 58.4        | 25.0      | 13.7  | 13.1    | 74.2  | .44   | 62    | 2.3          | 1.00  | 876          | 78    | 87                     |             |               |
| Percentage of Thatcher |                | 115.1      | 102.9       | 116.0     | 104.4 | 103.8   | 101.6 | 104.5 | 103.2 | 95.7         | 167.0 | 100.7        | 105.1 | 103.4                  |             |               |



NOTES ON SOME OF THE NEW PROMISING STRAINS

Each year many new strains are tested along with the leading commercial varieties for chemical, milling, and bread-baking quality. The four following new hybrid strains, expressed as a percentage of comparable samples of Thatcher (shown in table 11) appear to be some of the more promising strains tested during the past year.

N. No. 2211

N. No. 2211 is 1764 x Henry (C.I. 12733). It was included in the Uniform Regional Nursery for the first time in 1949. It is a very early wheat, is bearded, and has moderate resistance to leaf rust.

The weighted average of 11 comparable samples shows that N. No. 2211 has exceeded Thatcher in test-weight-per-bushel, protein content of wheat and flour, water absorption of flour, loaf volume of bread, grain texture and crumb color of bread. It yields slightly less flour and is lower in flour ash content than Thatcher. Most samples of N. No. 2211 have generally milled satisfactorily, but some have shown a tendency for the middlings to be difficult to reduce to flour. It is a wheat of good strength, considering the data as a whole, but not quite as strong as Thatcher.

N. No. 2239

N. No. 2239 is Henry x Cadet (C.I. 12779) and was developed at Langdon, North Dakota. It is resistant to leaf and stem rust and was grown at five stations during the past year.

Comparable milling and baking tests show that N. No. 2239 has exceeded Thatcher with respect to protein content of wheat and flour, and loaf volume of bread. It is very similar to Thatcher for most of the other quality properties. The quality of the gluten is good, but not as strong as that found in Thatcher.

Minn. 2824

Minn. 2824 is Thatcher x Surpresa II-39-8 (C.I. 12641). Two years' tests in the Regional Nursery have shown it to have good leaf rust resistance and high yield.

Three samples of Minn. 2824 grown during the past year show it exceeded Thatcher in test-weight-per-bushel, protein content of wheat and flour, flour yield, loaf volume, and crumb color of bread. It averaged considerably lower than Thatcher in ash content of flour.



N. D. 3654

N. D. 3654 is Lee x 3175. It has been a high yielding wheat of good quality.

The weighted average of three comparable samples shows that N. D. 3654 has exceeded Thatcher in most of the characteristics for which comparisons have been made. It has exceeded Thatcher in protein content of wheat by 0.6 of a percent, crumb color of bread by a score of 4 points, and grain texture by a score of 3 points among the principal quality properties compared.